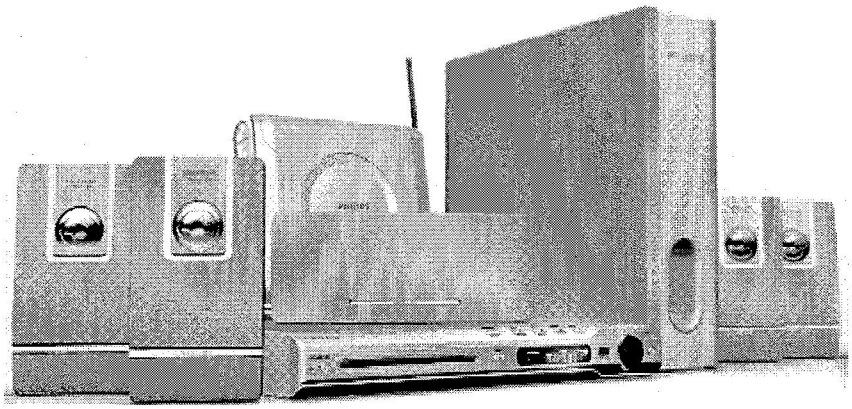
DVD Receiver

HTS5000W/51/12

Service
Service
Service



Service Manual

CLASS 1 LASER PRODUCT

MP3-CD PLAYBACK MP3

DVD VIDEO

COMPACT disc DIGITAL VIDEO

COMPACT disc DIGITAL AUDIO

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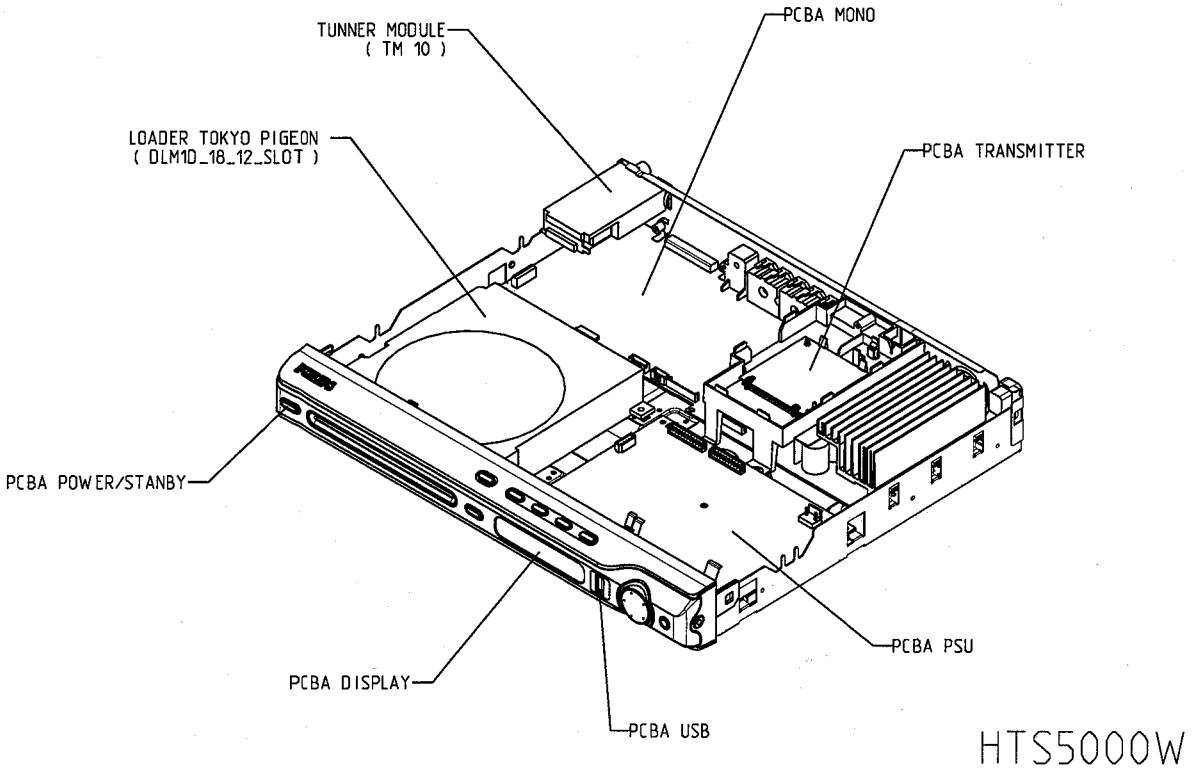
Version 1.0

PHILIPS



VERSION VARIATIONS:

	HTS5000W/12	HTS5000W/51
Video (Yellow, Cinch)	x	x
Component Video, (Y/Pb/Pr) -P-scan	x	x
SCART (CVBS/RGB)	x	-
Digital In - Coaxial	x	x
TV In (Left/Right)	-	x
Auxiliary (Left/Right)	x	x
Line out (Audio)	x	x

1. Specifications

1.1 General:

Mains voltage	: 230V for /12, /51
Mains frequency	: 50Hz for /12, /51
Power consumption	: 100W < 0.5W Eco standby power < 100W at 1/8 P_{rated} (For main unit)
Dimension main unit	: 360 x 54 x 324mm

1.2 Tuner

FM

Tuning range	: 87.5-108MHz
Grid	: 50kHz for /12, /05, /51
IF frequency	: 10.7MHz ± 25kHz
Aerial input	: 75Ω coaxial
Sensitivity at 26dB S/N	: < 7µV
Selectivity at 600kHz bandwidth	: > 25dB
IF rejection	: > 60dB
Image rejection	: > 25dB
Distortion at RF=1mV, dev. 75kHz	: < 3%
-3dB Limiting point	: < 8µV
Crosstalk at RF=1mV, dev. 67.5kHz	: > 28dB
Crosstalk at RF=1mV, dev. 40kHz	: > 18dB

MW

Tuning range	: 531-1602kHz for /12, /51, /98
Grid	: 9kHz for /12, /51,
IF frequency	: 450kHz ± 1kHz
Aerial input	: Frame aerial
Sensitivity at 26dB S/N	: < 4.0mV/M
Selectivity at 18kHz bandwidth	: > 20dB
IF rejection	: > 45dB
Image rejection	: > 28dB
Distortion at RF=50mV, m=80%	: < 5%

1.3 AMPLIFIER:

Output power	
Front	: 75W RMS / channel
Rear	: 75W RMS / channel
Center	: 100W RMS
Subwoofer	: 100W RMS
Frequency response ±0.5dB	: 120Hz-20kHz
Hum (Volume Minimum)	: 200nW
Residual noise (Volume Minimum)	: 40nW
Input sensitivity	
Aux In	: 1V ± 3dB at 22kΩ
Scart In	: 1V ± 3dB at 22kΩ
Output sensitivity	
Line Out (Left/Right)	: 1V ± 2dB at 10kΩ
Scart Out (Left/Right)	: 1V ± 2dB at 10kΩ

1.4 COMPACT DISC/VCD/DVD:

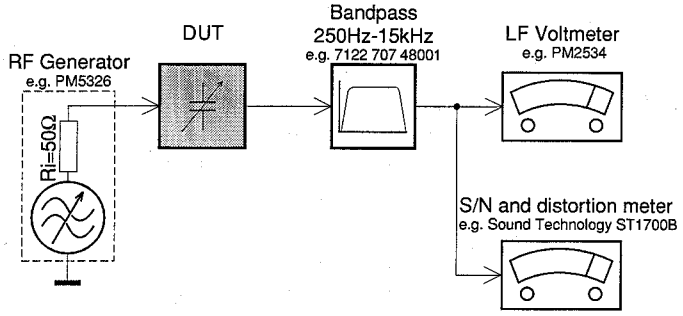
Video Decoding	: MPEG-1/MPEG-2/ MPEG-4/DivX 3.11, 4.x & 5.x
Video DAC	: 12 Bits
Signal System	: PAL / NTSC
Video Format	: 4:3 / 16:9
CVBS Out [1]	
CVBS level	: 1.0 ± 0.1V_{p-p}
Luminance S/N	: >= 60dB
S-Video Out [1]	
Y level	: 1.0 ± 0.1V_{p-p}
Y S/N	: >= 60dB
C level (burst)	: 286mV_{pp} +1/-4 dB
RGB/YUV Out 1)	
Amplitude	: 1.0 ± 0.1V_{p-p}
S/N	: >= 60dB

[1] Output terminals to be terminated with 75Ω

2. Measurements Setup, Service Aid & Lead Free Requirements

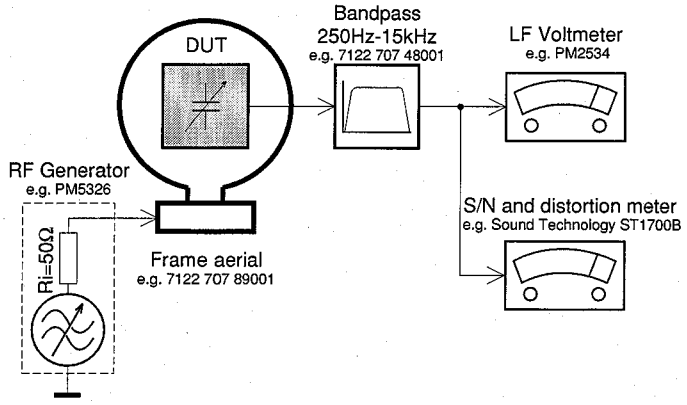
MEASUREMENT SETUP

Tuner FM



Use a bandpass filter to eliminate hum (50Hz, 100Hz) and disturbance from the pilottone (19kHz, 38kHz).

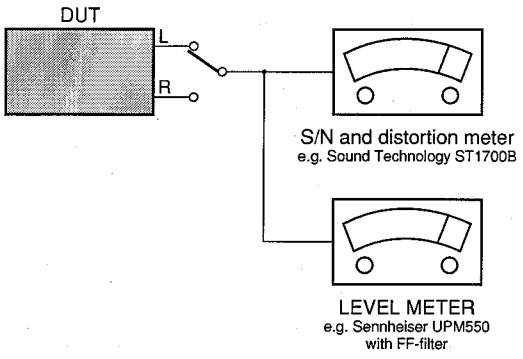
Tuner AM (MW,LW)



To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday´s cage.
Use a bandpass filter (or at least a high pass filter with 250Hz) to eliminate hum (50Hz, 100Hz).

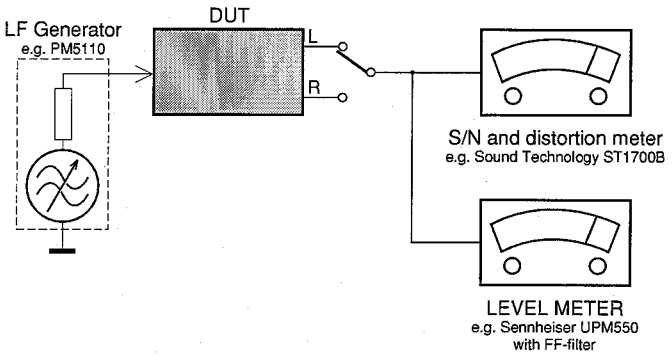
CD

Use Audio Signal Disc SBC429 4822 397 30184
(replaces test disc 3)



Recorder

Use Universal Test Cassette **CrO2** SBC419 4822 397 30069
or Universal Test Cassette **Fe** SBC420 4822 397 30071



SERVICE AIDS

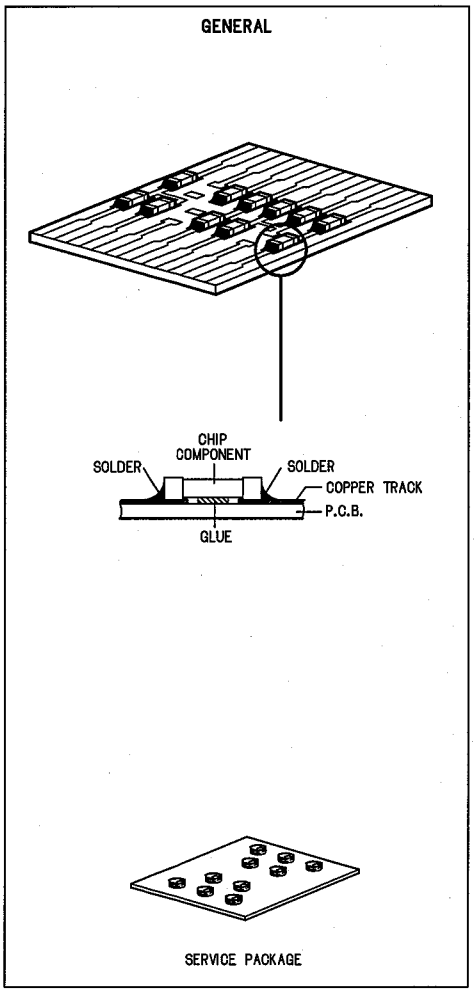
Service Tools:

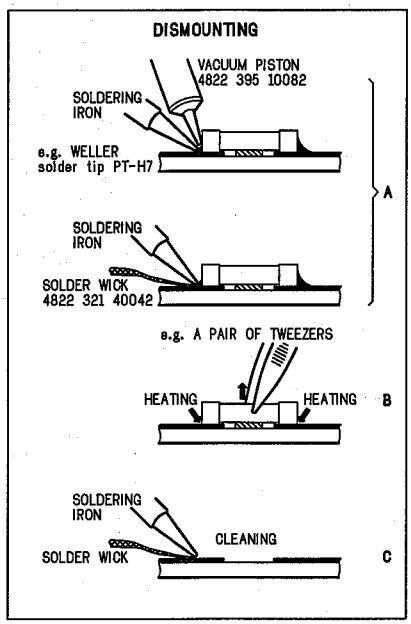
Universal Torx driver holder 4822 395 91019
Torx bit T10 150mm 4822 395 50456
Torx driver set T6 - T20 ..... 4822 395 50145
Torx driver T10 extended 4822 395 50423

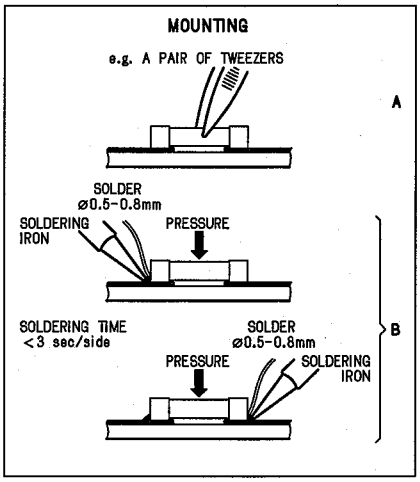
Compact Disc:

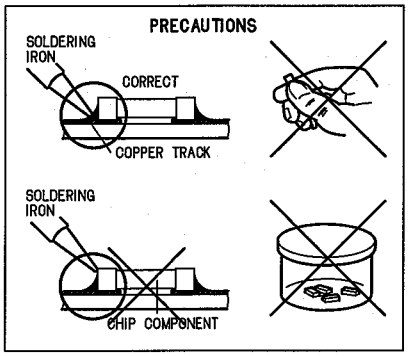
SBC426/426A Test disc 5 + 5A 4822 397 30096
SBC442 Audio Burn-in Test disc 1kHz 4822 397 30155
SBC429 Audio Signals disc 4822 397 30184
Dolby Pro-logic Test Disc 4822 395 10216

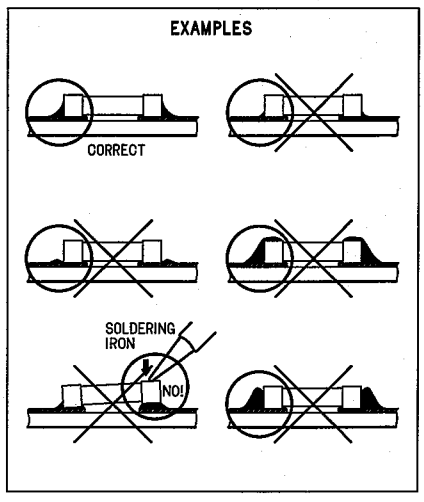
HANDLING CHIP COMPONENTS











(GB) WARNING

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools also at this potential.

ESD

(NL) WAARSCHUWING

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD). Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen. Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(F) ATTENTION

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

(D) WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kan die Lebensdauer drastisch reduzieren.
Veranlassen Sie, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand verbunden sind mit dem gleichen Potential wie die Masse des Gerätes.
Bauteile und Hilfsmittel auch auf dieses gleiche Potential halten.

(I) AVVERTIMENTO

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

(GB) ESD PROTECTION EQUIPMENT:

Complete Kit ESD3 (small tablemat, wristband, connection box, extention cable and earth cable) 4822 310 10671
Wristband tester 4822 344 13999

(GB)
Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified, be used
Safety components are marked by the symbol ⚠.

(NL)
Veiligheidsbepalingen vereisen, dat het apparaat bij reparatie in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.
De Veiligheidsonderdelen zijn aangeduid met het symbool ⚠

(F)
Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utiliséés les piéces de rechange identiques à celles spécifiées.
Less composants de sécurité sont marqués ⚠

(D)
Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Original zustand des Geräts darf nicht verändert werden; für Reparaturen sind Original-Ersatzteile zu verwenden.
Sicherheitsbauteile sind durch das Symbol ⚠ markiert.

(I)
Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambio identici a quelli specificati.
Componenty di sicurezza sono marcati con ⚠

(GB)
After servicing and before returning set to customer perform a leakage current measurement test from all exposed metal parts to earth ground to assure no shock hazard exist. The leakage current must not exceed 0.5mA.

CLASS 1
LASER PRODUCT

(GB) Warning !

Invisible laser radiation when open.
Avoid direct exposure to beam.

(S) Varning !

Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

(SF) Varoitus !

Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen!

(DK) Advarse !

Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling.

(F)
"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

2.1 Lead Free Requirements

Pb(Lead) Free Solder

When soldering , be sure to use the pb free solder.

INDENTIFICATION:

Regardless of special logo (not always indicated)

one must treat all sets from **1 Jan 2005** onwards, according next rules:

Important note: In fact also products of year 2004 must be treated in this way as long as you avoid mixing solder-alloys (leaded/ lead-free). So best to always use SAC305 and the higher temperatures belong to this.

Due to lead-free technology some rules have to be respected by the workshop during a repair:

- Use only lead-free solder alloy Philips SAC305 with order code 0622 149 00106. If lead-free solder-paste is required, please contact the manufacturer of your solder-equipment. In general use of solder-paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free solder alloy. The solder tool must be able
  - To reach at least a solder-temperature of 400°C,
  - To stabilize the adjusted temperature at the solder-tip
  - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature around 360°C – 380°C is reached and stabilized at the solder joint. Heating-time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C otherwise wear-out of tips will rise drastically and flux-fluid will be destroyed. To avoid wear-out of tips switch off un-used equipment, or reduce heat.
- Mix of lead-free solder alloy / parts with leaded solder alloy / parts is possible but PHILIPS recommends strongly to avoid mixed solder alloy types (leaded and lead-free).
  If one cannot avoid or does not know whether product is lead-free, clean carefully the solder-joint from old solder alloy and re-solder with new solder alloy (SAC305).
- Use only original spare-parts listed in the Service-Manuals. Not listed standard-material (commodities) has to be purchased at external companies.
- Special information for BGA-ICs:
  - always use the 12nc-recognizable soldering temperature profile of the specific BGA (for de-soldering always use the lead-free temperature profile, in case of doubt)
  - lead free BGA-ICs will be delivered in so-called 'dry-packaging' (sealed pack including a silica gel pack) to protect the IC against moisture. After opening, dependent of MSL-level seen on indicator-label in the bag, the BGA-IC possibly still has to be baked dry. (MSL=Moisture Sensitivity Level). This will be communicated via AYS-website.
  Do not re-use BGAs at all.
- For sets produced before 1.1.2005 (except products of 2004), containing leaded solder-alloy and components, all needed spare-parts will be available till the end of the service-period. For repair of such sets nothing changes.
- On our website **www.atyourservice.ce.Philips.com** you find more information to:
  - BGA-de-/soldering (+ baking instructions)
  - Heating-profiles of BGAs and other ICs used in Philips-sets

  You will find this and more technical information within the "magazine", chapter "workshop news".

For additional questions please contact your local repair-helpdesk.

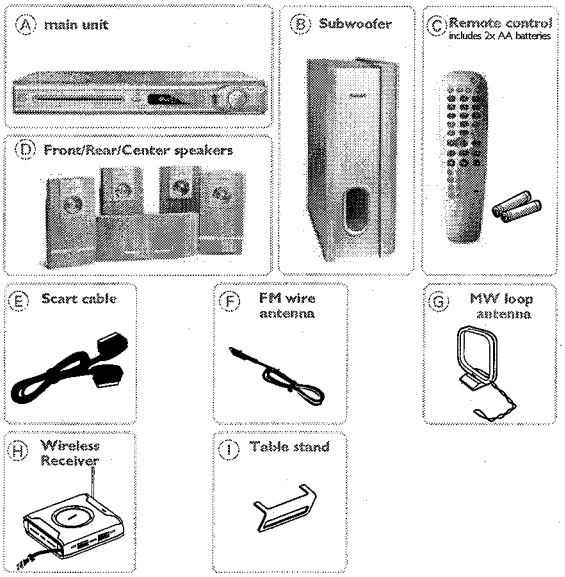
3. Directions For Use

The following except of the Quick Use Guide serves as an introduction to the set.
The Complete Direction for the Use can be downloaded in different languages from the internet site of Philips Customer care Center:
www.p4c.philips.com

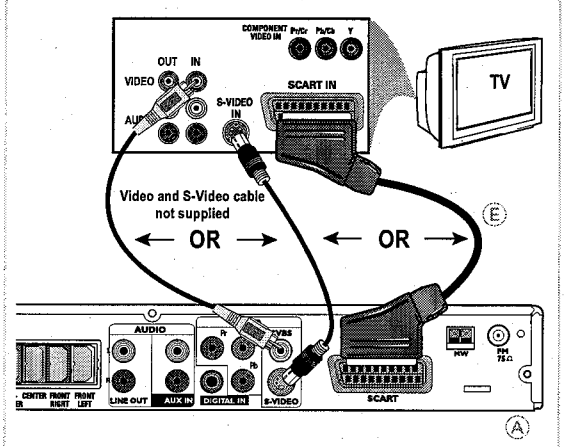
QUICK START GUIDE

HTS5000W
12nc: 3139 115 63522

1 what's in the box



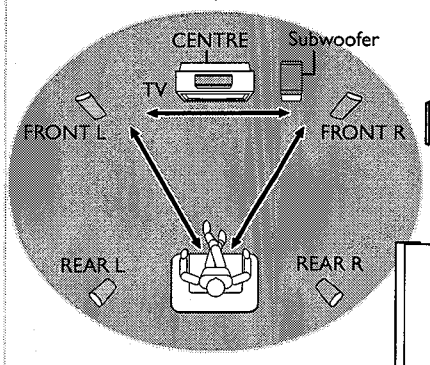
2 connect TV



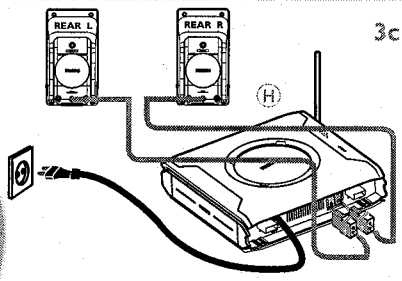
Note: For connecting to a Progressive Scan TV, refer to the user manual for proper connections and detailed set up.

3 connect subwoofer, speakers and antennas

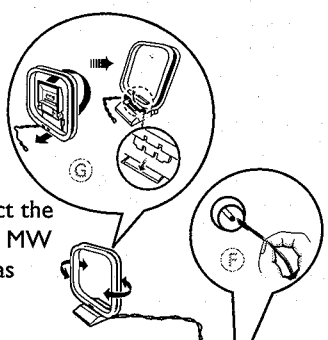
3a Placement of speakers



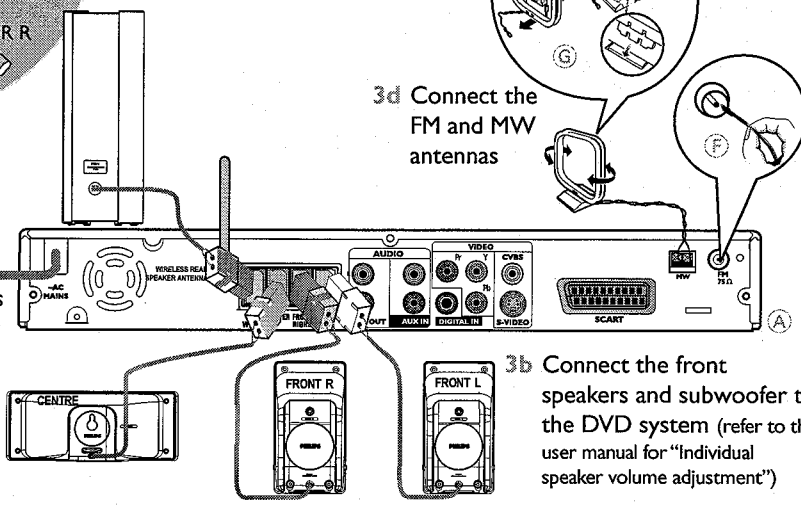
3c Connect the wireless rear speakers to the wireless receiver (refer to the user manual for "Wireless Receiver system")



3d Connect the FM and MW antennas

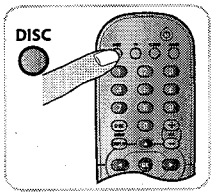


3e Connect the mains cord to the power supply



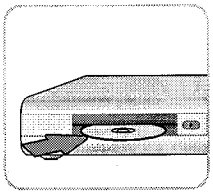
3b Connect the front speakers and subwoofer to the DVD system (refer to the user manual for "Individual speaker volume adjustment")

4 play a disc



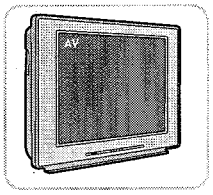
4a Press DISC.

Point the remote control towards the DVD system.



4b Insert a disc.

Press EJECT to eject in the disc.



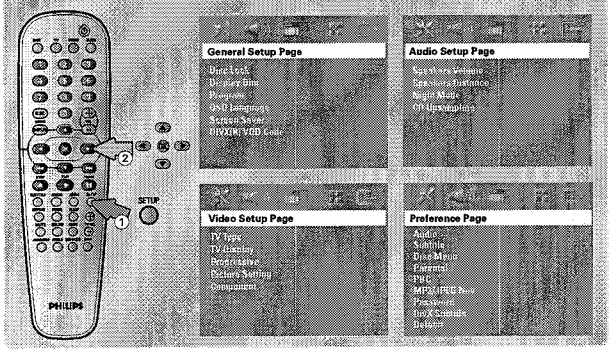
4c Select correct AV In channel

Switch to the correct input source by using the TV remote control.

GET PICTURE

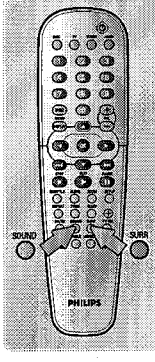
- Check the connection of the DVD system to TV is in place (see 2 Connect TV).
- Check the AV mode on TV. It may be called FRONT, A/V IN, or VIDEO. Choose the different modes using TV remote control.
- Or, use the TV remote control to select Channel 1 on TV, then press Channel down button until you get the picture.
- See your TV manual for more details.

More settings and features



Refer to chapters "DVD Setup Menu Options" in the user manual for detailed descriptions.

GET SOUND



No sound from rear speakers?
Press **SURR** button to select "Multi-Channel".

To enhance the sound quality
Press **SOUND** button to select a predefined digital sound effect.

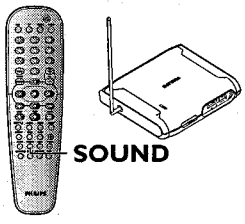
Detailed playback features and additional functions are described in the user manual.

5 wireless receiver setup

5a Turn on the DVD system and playback a disc.

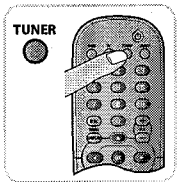
5b Select the same transmission frequency channel for both wireless transmitter and receiver.
The wireless system will automatically turn on when receiving an audio signal and vice versa.)

On the wireless transmitter :
The default preset frequency is (1).
Press and hold **SOUND** button on the remote until the best frequency that obtains optimal reception.



Refer to chapters "Wireless Receiver system" in the user manual for detailed descriptions.

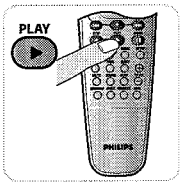
6 programme radio stations



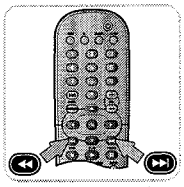
6a Press TUNER.

AUTO INSTALL PRESS PLAY

Note: This feature is only available for first time setup.



6b Press PLAY ▶ to start auto installation. It will start to programme all available radio stations.



6c Once complete, use ⏮ / ⏭ to select a preset radio station.

4. Dismantling Instructions

4.1 Dismantling of the PSU Board

1) The disc can be manually remove by inserting a minus screw driver and push the lever in the direction as shown in Figure 3-1 to unlock the tray and eject the disc out.

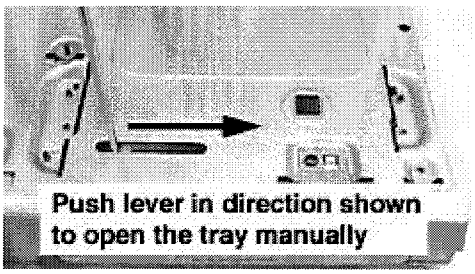


Figure 4-1

2) Loosen 5 screws Pos 272 to remove the Front Top.
- 1 screw each on the left and right side.
- 3 screws at the rear of the set.

3) Loosen 4 screws Pos 258 to remove PSU Board as shown in Figure 3-2.

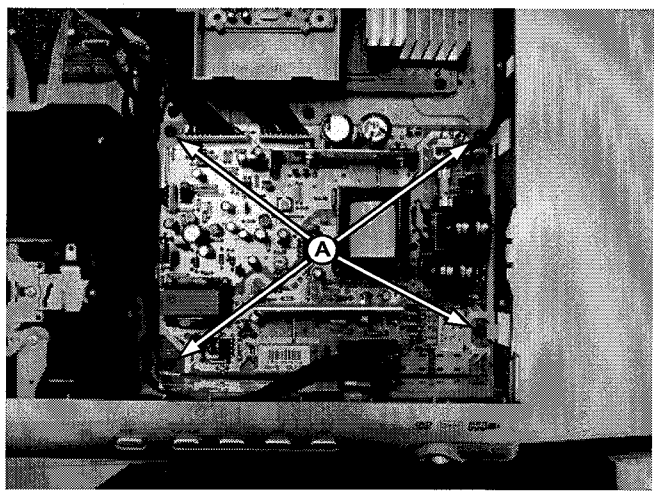


Figure 4-2

4.2 Dismantling of the Front Panel

1) Release 4 catches to remove the Front Panel Assy.
- 1 catch each on the left and the right side.
- 2 catches at the bottom of the set.

4.3 Dismantling of the Mono Board

1) Loosen 2 screws Pos 273 to remove the Transmitter Board. (See Figure 3-3 & 3-4)

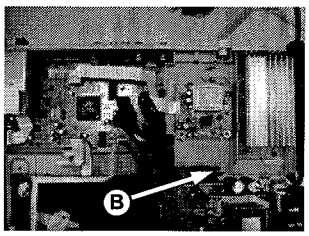


Figure 4-3

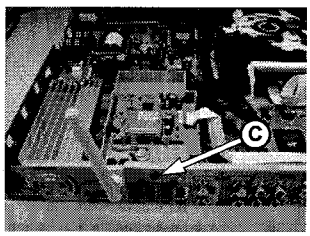


Figure 4-4

2) Loosen 1 screw Pos 260 to remove Tuner Module.

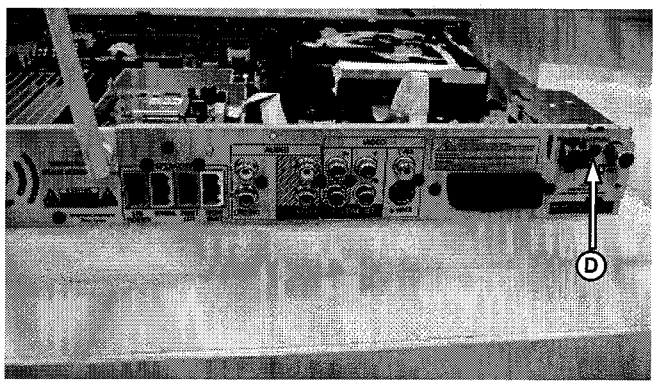


Figure 4-5

3) Loosen 4 screws Pos 257 as shown in Figure 3-6

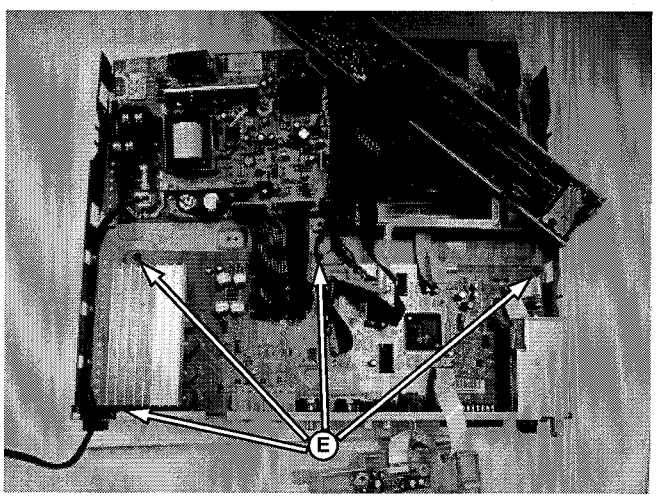


Figure 4-6

4) Loosen 8 screws to remove Mono Board.
   - 2 screws Pos 262
   - 1 screw Pos 265
   - 1 screw Pos 268
   - 1 screw Pos 264
   - 1 screw Pos 267
   - 2 screws Pos 269

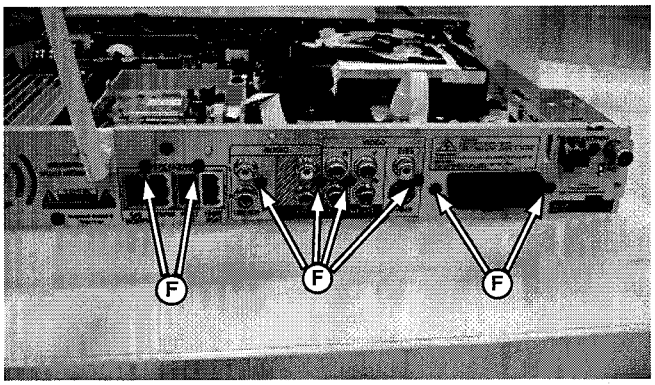


Figure 4-7

4.4 Dismantling of the DVD LOADER

1) Loosen 4 screws Pos 254 to remove the DVD LOADER.

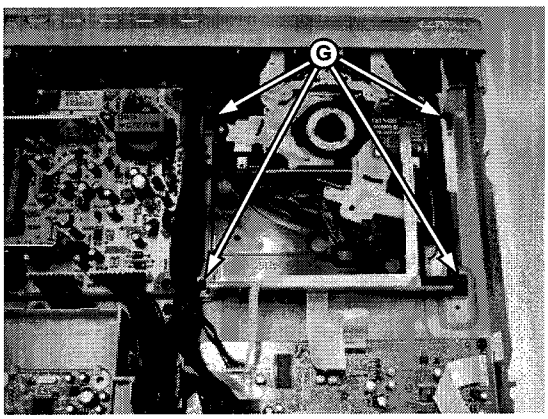


Figure 4-8

4.5 Service Positions

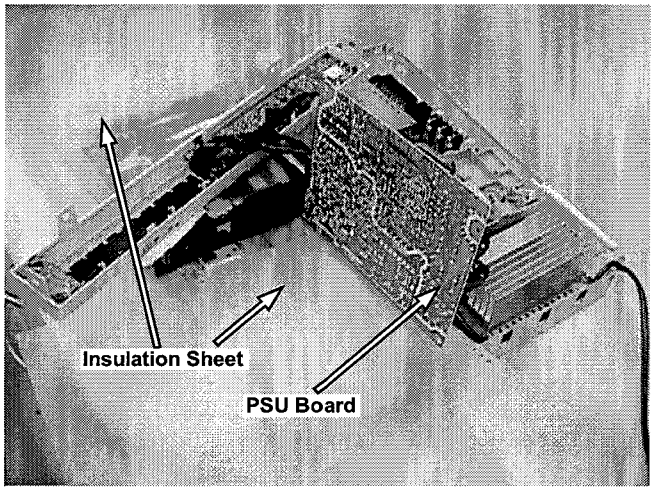


Figure 4-9
Service Position
PSU Board

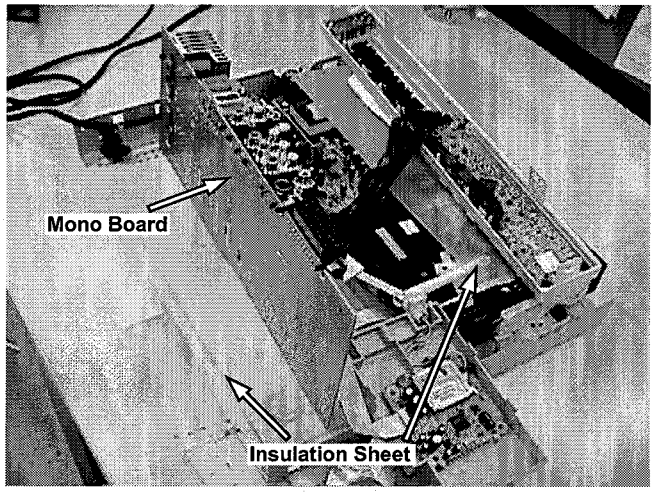


Figure 4-10
Service Position
Mono Board

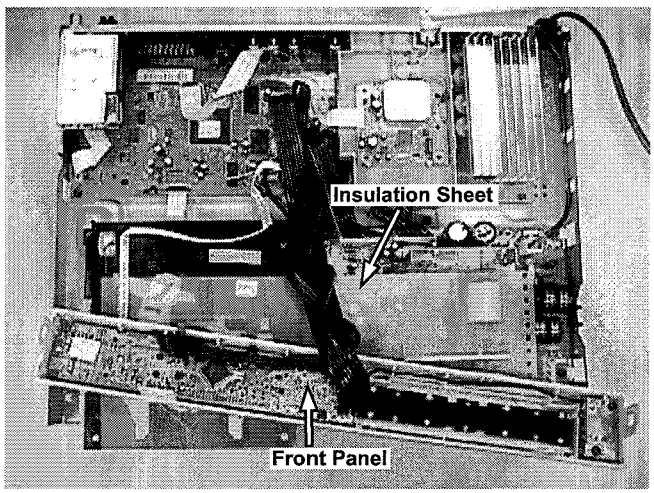
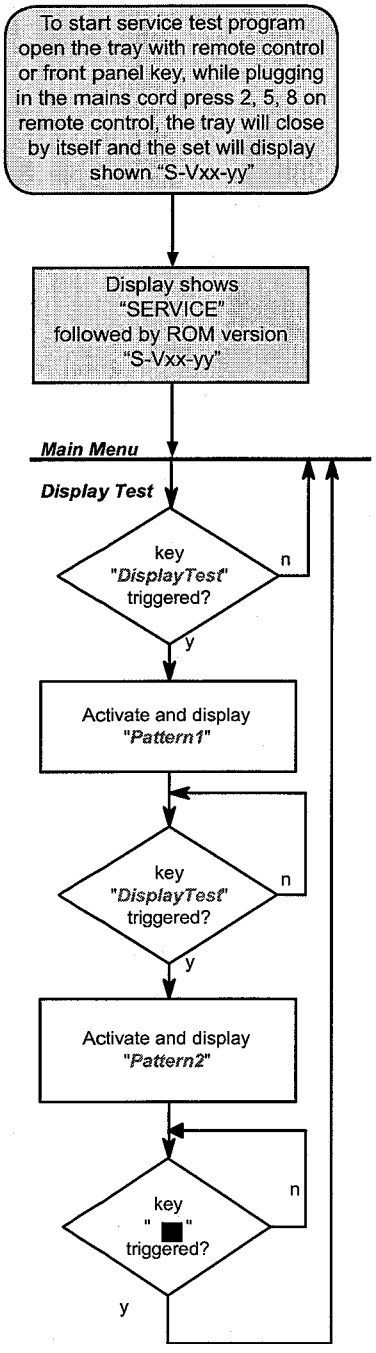


Figure 4-11
Service Position
Front Panel

5. Service Test Program


To start service test program open the tray with remote control or front panel key, while plugging in the mains cord press 2, 5, 8 on remote control, the tray will close by itself and the set will display shown "S-Vxx-yy"
Display shows "SERVICE" followed by ROM version "S-Vxx-yy"
Main Menu
Display Test
key "DisplayTest" triggered?
n
y
Activate and display "Pattern1"
key "DisplayTest" triggered?
n
y
Activate and display "Pattern2"
key " ■ " triggered?
n
y

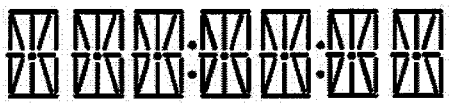
S refers to Service Mode
V refers to Version
xx refers to Software version number of BEA (counting up from 01 to 99)
yy refers to Software version number of Front uP (counting up from 01 to 99)

4.1 Display Test

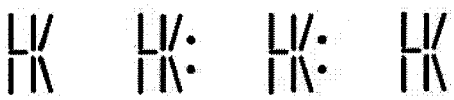
Purpose:
This test is used to check the driving circuits, the display and whether there are any short-circuits, open-circuits or any other defects.

Player:

Following display patterns are used to test the display and its connections to µP.
Pattern 1: *Default: All display control pins are ON*
- to check the open-circuits

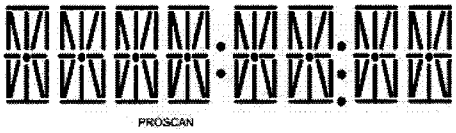


Pattern 2: *Alternate display control pins are on (Test Pattern: 0x55)*
- to check the short-circuits on Data port



Receiver:

Following display patterns are used to test the display and its connections to µP.
Pattern 1: *Default: All display control pins are ON*
- to check the open-circuits



Pattern 2: *Alternate display control pins are on (Test Pattern: 0x55)*
- to check the short-circuits on Data port

TEST	Activated with	ACTION
ROTARY ENCODER TEST	Volume Knob	Display shows value for 2 seconds. Volume values increases or decreases in steps of 1 until 0 (VOL MIN) or 40 (VOL MAX) is reached.
LEAVE SERVICE TEST PROGRAM	Disconnect mains cord	

5.1.1 Reprogramming of DVD version Matrix

After repair, the customer setting and region code may be lost. Reprogramming will put the set back in the state in which it has left the factory, ie. with the default setting and the allowed region code.

Model	Region	Region Code	TV Type
HTS 5000W/12	EU	2	PAL
HTS 5000W/51	Russia	5	PAL

To reprogram do as follows:

1) Power up the set and select DISC source.
2) Open tray by press "OPEN/CLOSE" button on the set or press and hold "STOP" button on the RC.
3) Press the following buttons on the Remote Control:
   <9> <9> <9> <9> <AUDIO> <6> ..... for HTS 5000W/12
   <9> <9> <9> <9> <AUDIO> <7> ..... for HTS 5000W/51
4) The display shows **'YYYY-ZZ'** and the tray will close.
   YYYY = model number (eg. 8300, 8500, etc.)
   ZZ = slash stroke version (eg. 01, 69, etc.)

5.1.2 Procedure for check Software version

1) Power up the set and select DISC source.
2) Open tray by press "OPEN/CLOSE" button on the set or press and hold "STOP" button on the RC.
3) Press "DISPLAY" button on the Remote control.
4) The TV screen will shows:

PPPP-Vxx YYYYY-ZZ
SERVO: GGGG GGGG REG:DD

PPPP = LX1S, LX1D or LX2W
xx = version number
YYYYY = model # - 3000S/20000/5000W
ZZ = stroke version
DD = region code
GGGG GGGG = version for servo code

5.1.3 Burning of firmware

1. Unzip the zip-archive attached with this service information.
2. Start the CD burning software and create a new CD Project (Data disc) with the following settings:
   a. File System: ISO9660
   b. Format: MODE 2/XA
   c. Recording format: Single Session (Track at once), Finalized CD
3. Place the content of the zip-archive into the root directory of the new CD project.
4. Burn the data onto a blank CDR or CDRW.

Note: ISO9660 is mandatory, UDF discs are not supported! The final CDROM must not contain any other data except the file from the zip-archive.

5.1.4 Procedure to upgrade the firmware

1. Power up the set and open tray.
2. Insert the prepared Upgrade CDROM and close the tray.
3. The set will display:

   LOAD -> MULTICH ->..... ->UPG END.
   The whole process takes less than 2 minutes.

Note: Do not press any button or interrupt the main supply upgrading process,Otherwise the set may become defective.

4. When the upgrade is completed, the tray will close automatic.
5. The tray will close and the set will go to Standby mode automatically when the upgrade process is completed.

5.1.5 Procedure to check the firmware version to confirm upgrading

1. Power up the set and open tray.
2. Press the <Menu Display> button on the Remote Control.
3. The firmware version will be displayed on the top left hand corner of the OSD.

5.1.6 Trade Mode

Trade mode is a feature that will block all set keys when enabled. It is for dealers to prevent customers from removing disc, changing source etc using the set keys.Rotary and Remote Control (RC) keys are still allowed inTrade mode.

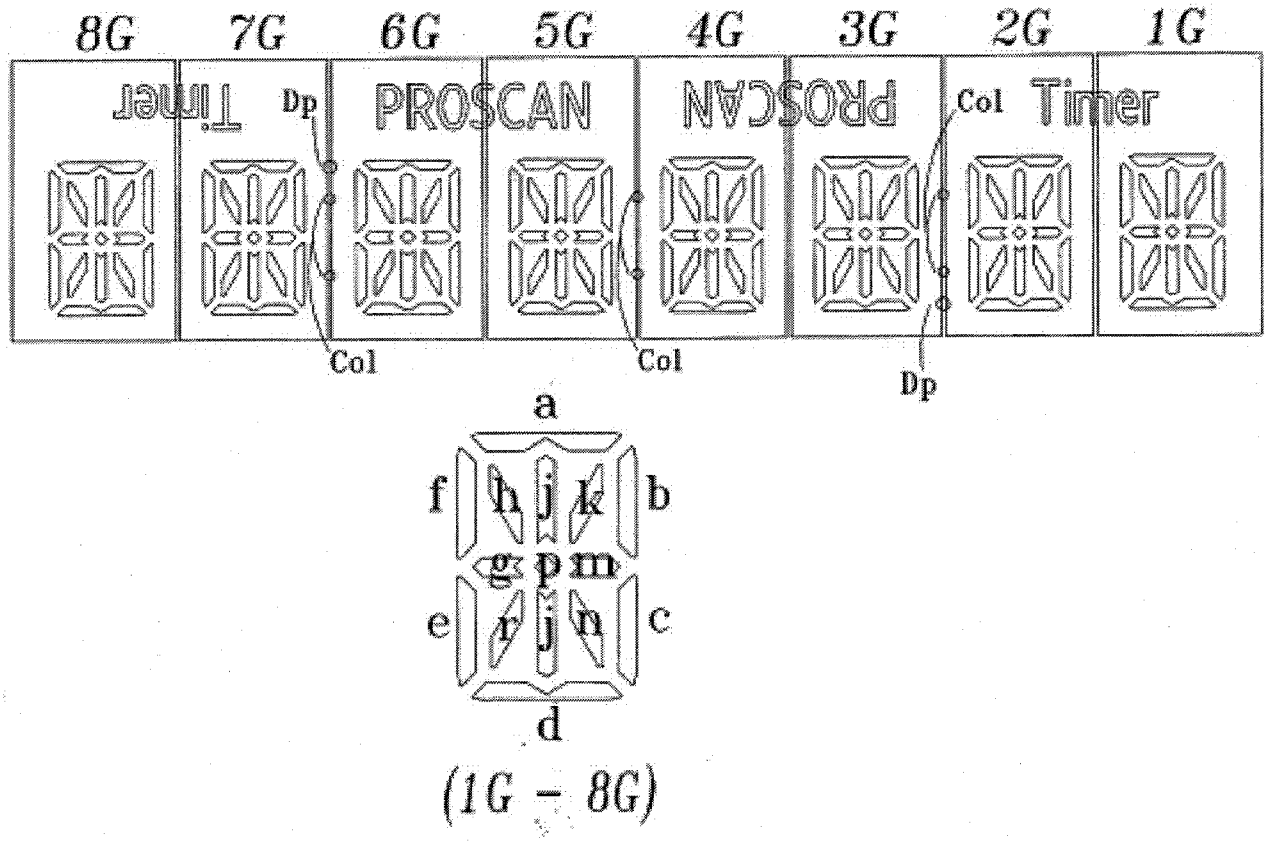
To activate Trade Mode:

1) Power up the set and select DISC source.
2) Open tray by press "OPEN/CLOSE" button on the set or press and hold "STOP" button on the RC.
3) Then press buttons <2> <5> <9> on the RC.
4) The display shows **'TRA ON'** and the tray will close.
Trade Mode is now enabled.

To deactivate Trade Mode:

1) Power up the set and select DISC source.
2) Open tray by press and hold "STOP"button on the RC.
3) Then press buttons <2> <5> <9> on the RC.
4) The display shows **'TRA OFF'** and the tray will close.
Trade Mode is now disabled.

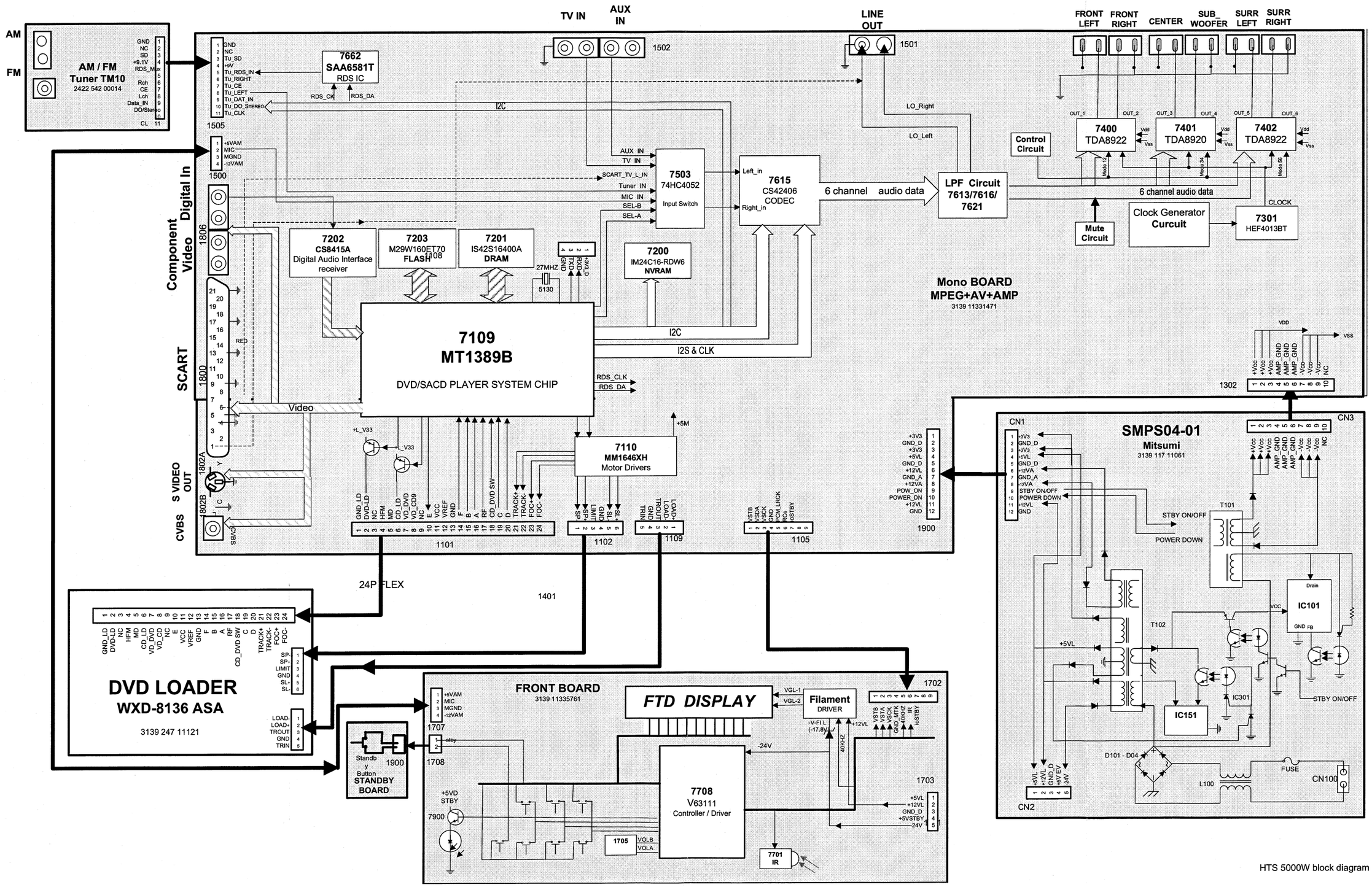
6. FTD Display Pin Connection



	8G	7G	6G	5G	4G	3G	2G	1G
P1	a	a	a	a	a	a	a	a
P2	j	j	j	j	j	j	j	j
P3	h	h	h	h	h	h	h	h
P4	k	k	k	k	k	k	k	k
P5	b	b	b	b	b	b	b	b
P6	f	f	f	f	f	f	f	f
P7	m	m	m	m	m	m	m	m
P8	g	g	g	g	g	g	g	g
P9	c	c	c	c	c	c	c	c
P10	e	e	e	e	e	e	e	e
P11	r	r	r	r	r	r	r	r
P12	n	n	n	n	n	n	n	n
P13	d	d	d	d	d	d	d	d
P14		col		col		col		
P15	p	p	p	p	p	p	p	p
P16	Timer		PROSCAN		PROSCAN		Timer	
P17		dp				dp		

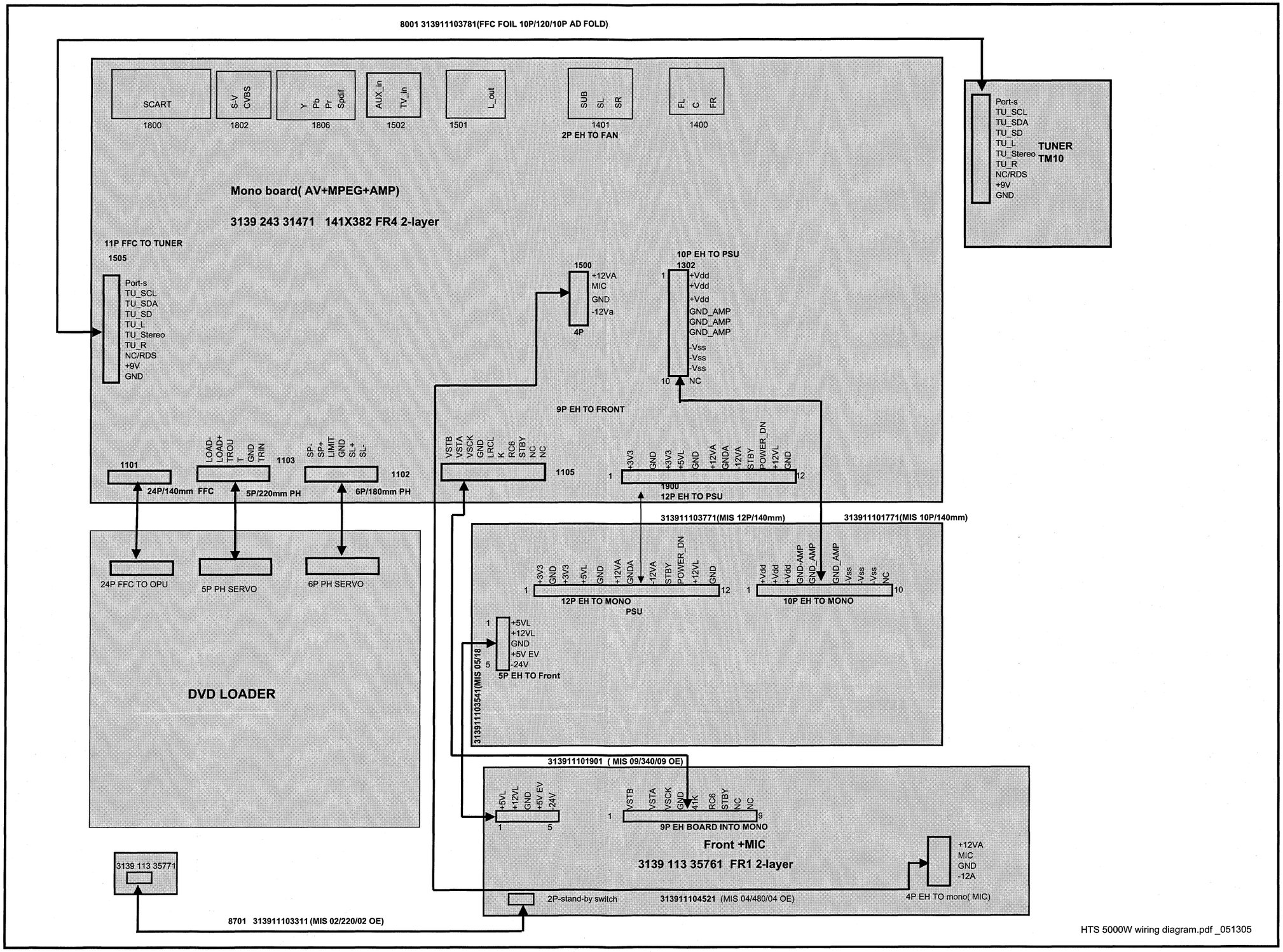
Notes:

7. Block Diagram

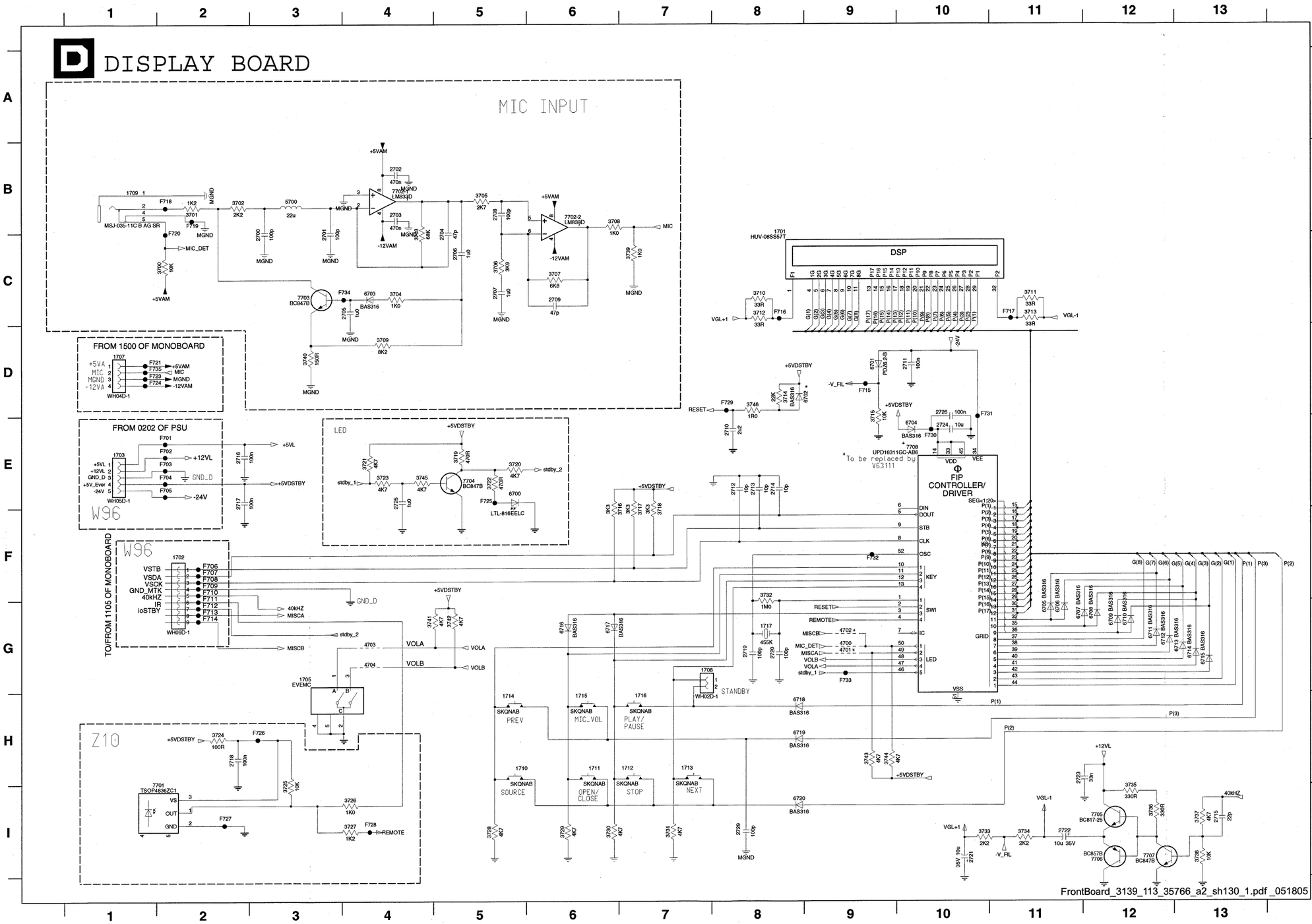


HTS 5000W block diagram

Wiring Diagram

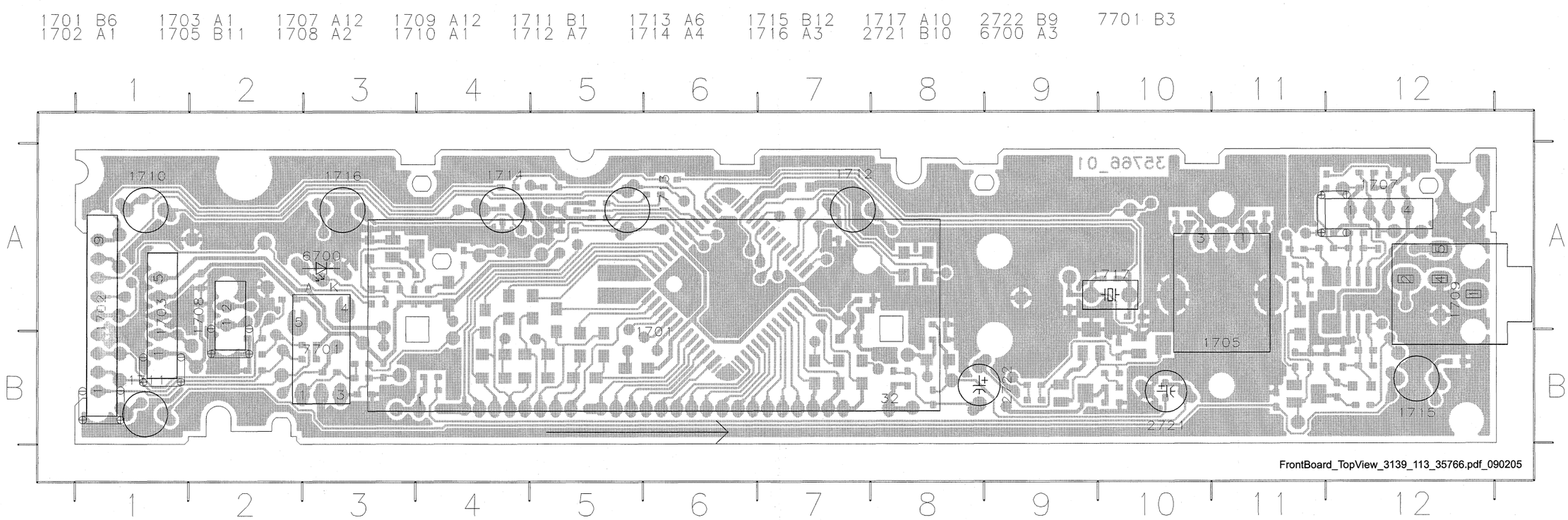


8. Front: Display



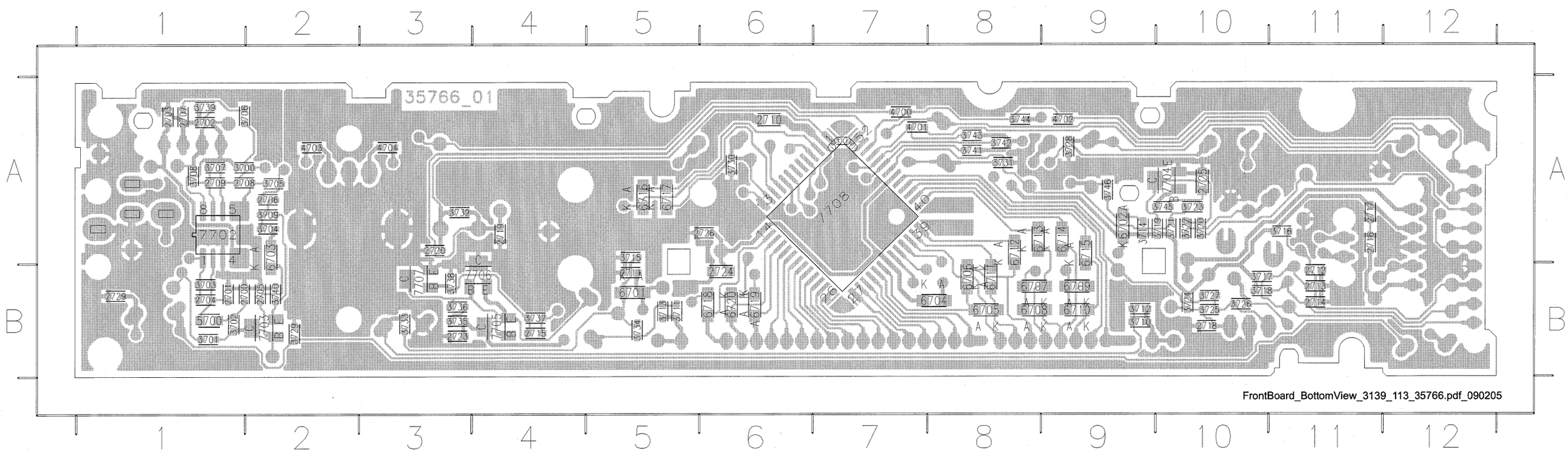
1701 C8 6717 G6
1702 F2 6718 H8
1703 E1 6719 H8
1705 G3 6720 I8
1707 D1 7701 I2
1708 G7 7702-1 B4
1709 B1 7702-2 B6
1710 H5 7703 C3
1711 H6 7704 E5
1712 H7 7705 I12
1713 H7 7706 I12
1714 H5 7707 I12
1715 H6 7708 E10
1716 H7 F701 E2
1717 G8 F702 E2
2700 C3 F703 E2
2701 C3 F704 E2
2702 B4 F705 E2
2703 B4 F706 F2
2704 C5 F707 F2
2705 C4 F708 F2
2706 C5 F709 F2
2707 C5 F710 F2
2708 B5 F711 F2
2709 C6 F712 G2
2710 E8 F713 G2
2711 D10 F714 G2
2712 E8 F715 D9
2713 E8 F716 C8
2714 E8 F717 C11
2715 I13 F718 B2
2716 E2 F719 B2
2717 E2 F720 C2
2718 H2 F721 D1
2719 G8 F723 D1
2720 G8 F724 D1
2721 I10 F725 E5
2722 I11 F726 H3
2723 H11 F727 I2
2724 E10 F728 I4
2725 E4 F729 D8
2726 D10 F730 E10
2729 I8 F731 E10
3700 C2 F732 F9
3701 B2 F733 G9
3702 B2 F734 C4
3703 C4 F735 D1
3704 C4
3705 B5
3706 C5
3707 C6
3708 B6
3709 D4
3710 C8
3711 C11
3712 C8
3713 C11
3714 D8
3715 E9
3716 F6
3717 F7
3718 F7
3719 E5
3720 E5
3721 E4
3722 E5
3723 E4
3724 H2
3725 I3
3726 I4
3727 I4
3728 I5
3729 I6
3730 I6
3731 I7
3732 F8
3733 I10
3734 I11
3735 I12
3736 I12
3737 I13
3738 I13
3739 C7
3740 D3
3741 G4
3742 G5
3743 H9
3744 H9
3745 E4
3746 D8
4700 G9
4701 G9
4702 G9
4703 G4
4704 G4
5700 B3
6700 E5
6701 D9
6702 D8
6703 C4
6704 E10
6705 G11
6706 G11
6707 G11
6708 G12
6709 G12
6710 G12
6711 G12
6712 G12
6713 G13
6714 G13
6715 G13
6716 G6

Front: Display (topview)

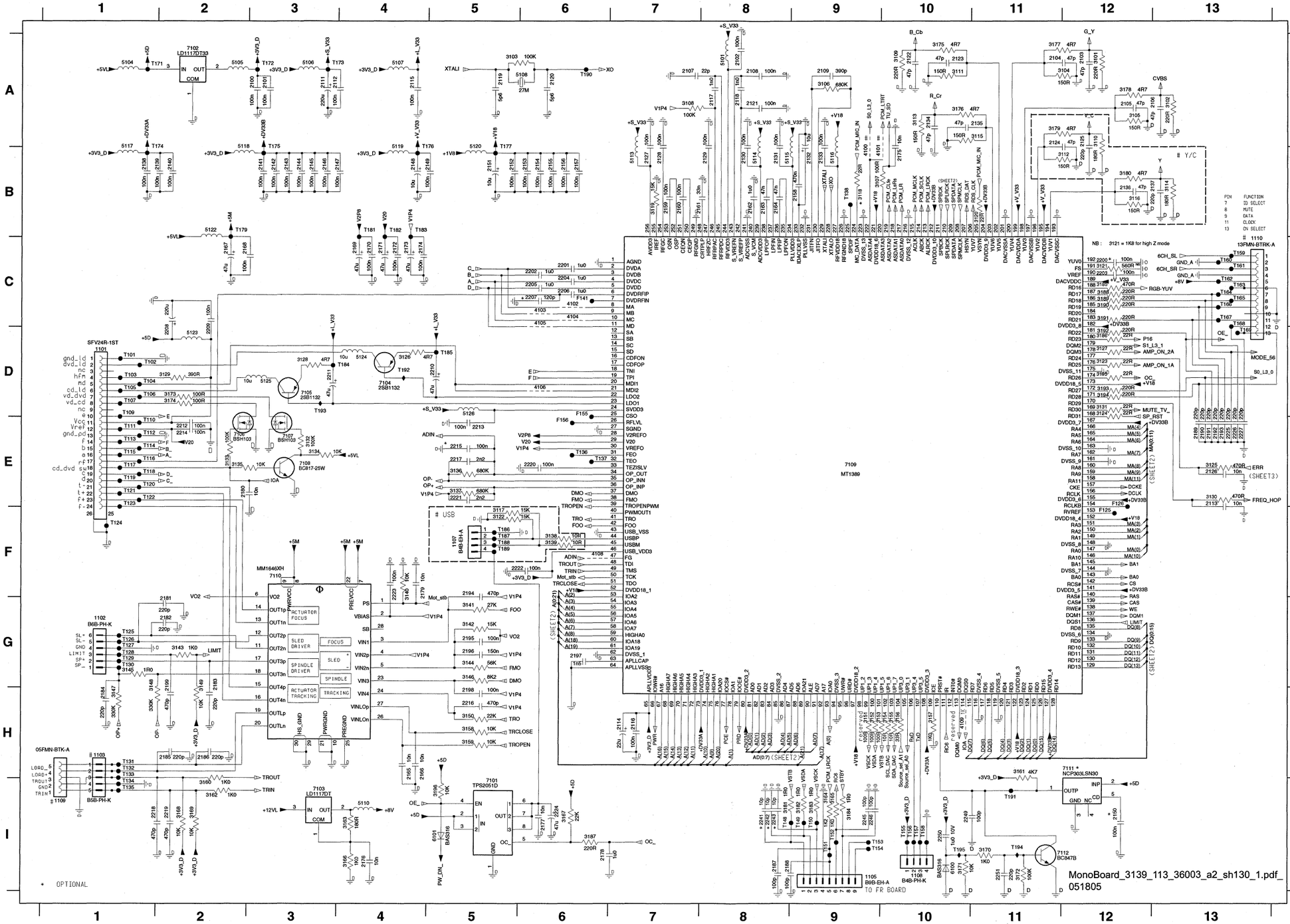


Front: Display (Bottom view)

2700 B1	2709 A1	2718 B10	3701 B1	3710 B9	3719 A10	3728 A9	3737 B4	3746 A9	6703 A2	6712 A8	7702 A1
2701 B1	2710 A6	2719 A4	3702 B1	3711 B5	3720 A10	3729 B2	3738 B3	4700 A7	6704 B8	6713 A8	7703 B2
2702 A1	2711 B5	2720 A3	3703 B1	3712 B9	3721 A10	3730 A6	3739 A1	4701 A7	6705 B8	6714 A9	7704 A10
2703 A1	2712 B11	2723 B3	3704 A2	3713 B5	3722 A10	3731 A8	3740 B2	4702 A9	6706 B8	6715 A9	7705 B4
2704 B1	2713 B11	2724 B6	3705 A2	3714 A9	3723 A10	3732 A3	3741 A8	4703 A2	6707 B8	6716 A5	7706 B4
2705 B2	2714 B11	2725 A10	3706 A1	3715 A5	3724 B10	3733 B3	3742 A8	4704 A3	6708 B8	6717 A5	7707 B3
2706 A2	2715 B4	2726 A6	3707 A1	3716 A11	3725 B10	3734 B5	3743 A8	5700 B1	6709 B9	6718 B6	7708 A7
2707 A1	2716 A11	2729 B1	3708 A1	3717 B10	3726 B10	3735 B3	3744 A8	6701 B5	6710 B9	6719 B6	
2708 A1	2717 A11	3700 A1	3709 A2	3718 B10	3727 B10	3736 B3	3745 A10	6702 A9	6711 B8	6720 B6	

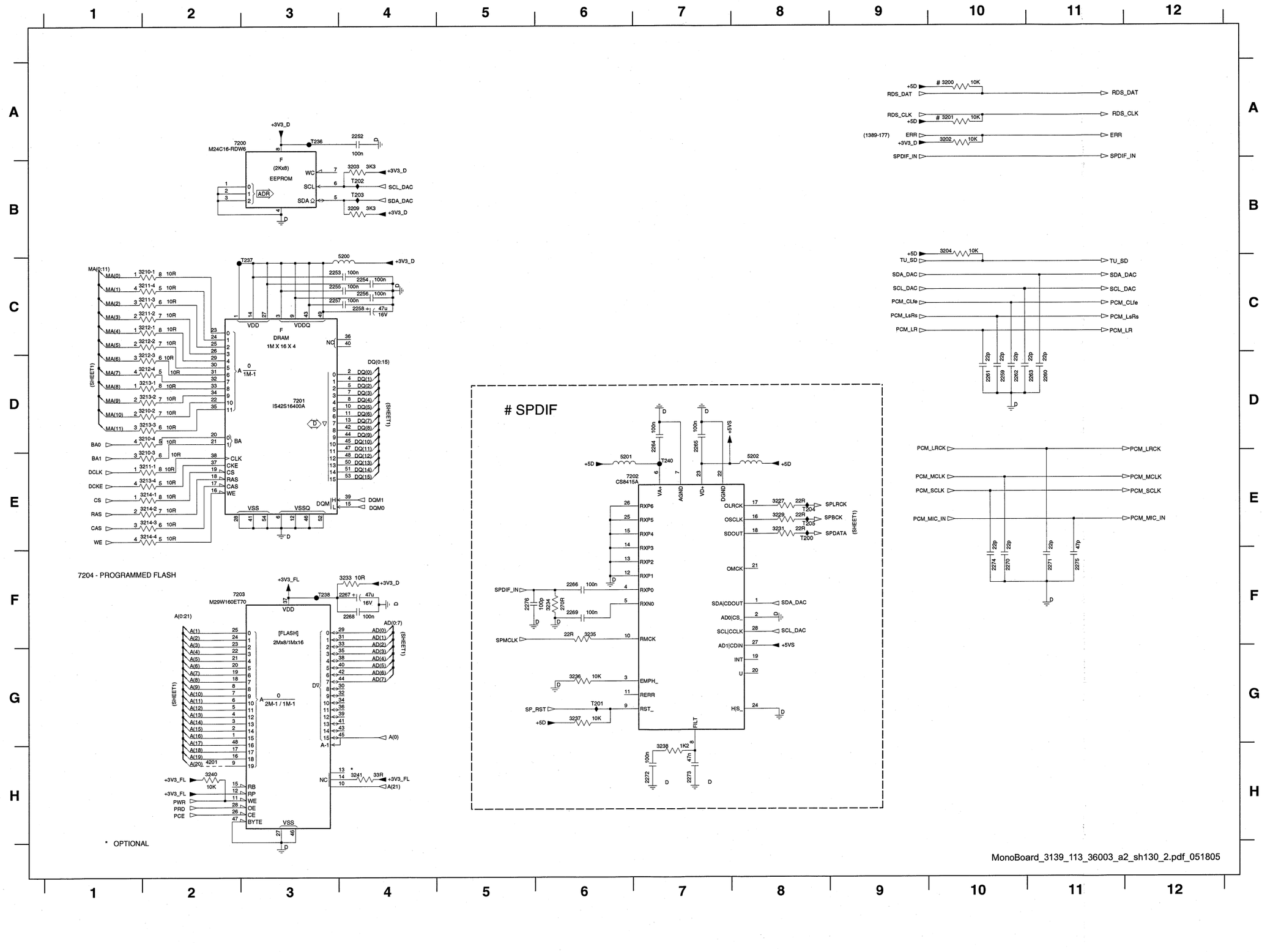


Mono Board: Circuit Diagram (Part 1)



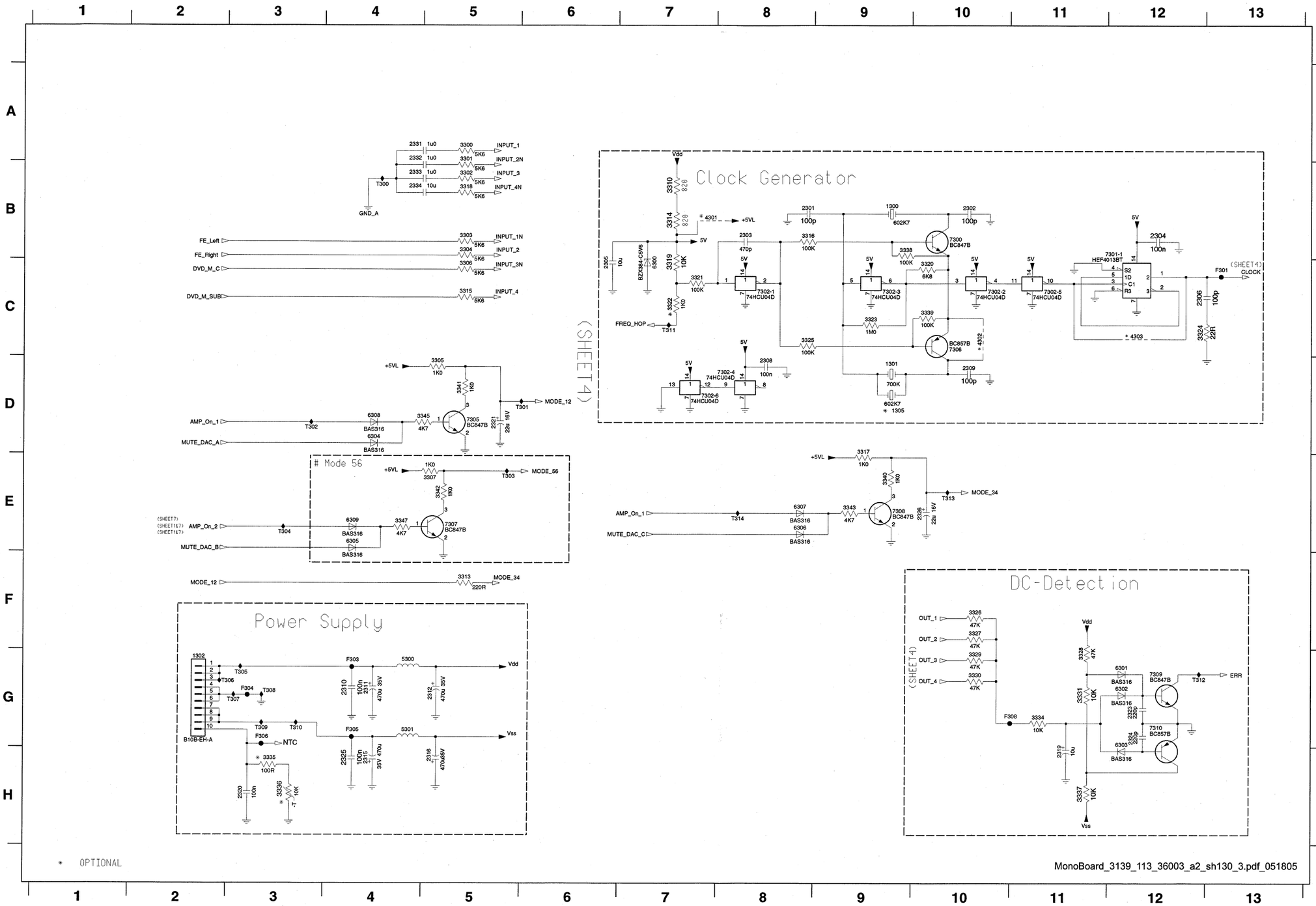
1101 D1	2209 D2	3190 C12	T173 A3	
1102 G1	2210 D5	3191 C12	T174 B1	
1103 H1	2211 D3	3192 D12	T175 B3	
1105 I9	2212 E2	3193 D12	T176 B4	
1107 F5	2213 E5	3194 D12	T177 B5	
1108 I10	2214 E2	3195 D12	T179 B2	
1109 I1	2215 E5	3196 I5	T181 B4	
1110 C13	2216 H5	4100 B9	T182 B4	
2100 A3	2217 E5	4101 B9	T183 B4	
2101 A3	2218 I1	4102 C6	T184 D4	
2102 A8	2219 I2	4103 C6	T185 D5	
2103 A12	2220 E6	4104 C6	T186 F5	
2104 A11	2221 E5	4105 C6	T187 F5	
2105 A12	2222 F5	4106 D6	T188 F5	
2106 A12	2223 F4	4108 F6	T189 F5	
2107 A7	2224 I6	4109 H10	T190 A6	
2108 A8	2225 E13	5101 A8	T191 I11	
2109 A9	2226 E13	5104 A1	T192 D4	
2111 A3	2227 E13	5105 A2	T193 D3	
2112 A3	2241 I8	5106 A3	T194 I11	
2113 E13	2242 I8	5107 A4	T195 I10	
2114 H7	2243 I8	5108 A6		
2115 A4	2245 I9	5110 I4		
2116 H7	2246 I9	5113 B7		
2117 A8	2249 I10	5114 B8		
2118 A8	2250 I10	5115 B8		
2119 A5	2251 I11	5116 B9		
2120 A6	3101 A12	5117 B1		
2121 A8	3102 A13	5118 B2		
2122 A10	3103 A5	5119 B4		
2123 A10	3104 A12	5120 B5		
2124 A11	3105 A12	5122 B2		
2125 A12	3106 A9	5123 D2		
2126 E13	3107 B9	5124 D4		
2127 B7	3108 A7	5125 D3		
2128 B7	3109 A10	5126 D5		
2129 B8	3110 A12	6100 I10		
2130 B8	3111 A10	6101 I5		
2131 B8	3112 B12	7101 I5		
2132 B9	3113 A10	7102 A2		
2133 B9	3114 B13	7103 I3		
2134 A10	3115 A11	7104 D4		
2135 A11	3116 B12	7105 D3		
2136 B12	3117 F5	7106 E2		
2137 B12	3118 B9	7107 E3		
2138 B1	3119 B7	7108 E3		
2139 B2	3120 B11	7109 E9		
2140 B2	3121 C12	7110 F3		
2141 B3	3122 F5	7111 H12		
2142 B3	3123 D12	7112 I11		
2143 B3	3124 D12	7125 F12		
2144 B3	3125 E13	7126 E12		
2145 B3	3126 D4	7141 C6		
2146 B3	3127 D12	7155 D6		
2147 B4	3128 D3	7156 E6		
2148 B4	3129 D2	7101 D1		
2149 B5	3130 E13	7102 D1		
2150 I12	3131 D12	7103 D1		
2151 B5	3132 E3	7104 D1		
2152 B5	3133 E2	7105 D1		
2153 B6	3134 E3	7106 D1		
2154 B6	3135 E2	7107 D1		
2155 B6	3136 E5	7109 D1		
2156 B6	3137 E5	7110 E1		
2157 B6	3138 F6	7111 E1		
2158 B9	3139 F6	7112 E1		
2159 B7	3140 F4	7113 E1		
2160 B7	3141 G5	7114 E1		
2161 B7	3142 G5	7115 E1		
2162 B8	3143 G2	7116 E1		
2163 B8	3144 G5	7117 E1		
2164 B8	3145 G1	7118 E1		
2165 H4	3146 G5	7119 E1		
2166 H4	3147 H1	7120 E1		
2167 C2	3148 G1	7121 E1		
2168 C2	3149 G2	7122 E1		
2169 C4	3150 H5	7123 E1		
2170 C4	3151 H9	7124 F1		
2171 C4	3152 H9	7125 G1		
2172 C4	3153 H9	7126 G1		
2173 C4	3154 H10	7127 G1		
2174 C4	3155 H10	7128 G1		
2175 B10	3156 H10	7129 G1		
2176 I4	3157 H10	7130 G1		
2177 I6	3158 H5	7131 H1		
2178 I6	3159 H5	7132 H1		
2179 F4	3160 I2	7133 H1		
2180 E2	3161 H11	7134 I1		
2181 G2	3162 I2	7135 I1		
2182 G2	3163 I4	7136 E6		
2183 G2	3164 I9	7137 E6		
2184 H1	3165 I9	7138 B9		
2185 H2	3166 I4	7148 I8		
2186 H2	3167 I6	7149 I9		
2187 I8	3168 I2	7150 I9		
2188 I8	3169 I2	7151 I9		
2189 E13	3170 I11	7152 I9		
2190 E13	3171 I10	7153 I9		
2191 E13	3172 I11	7154 I9		
2192 E13	3173 D2	7155 I10		
2193 E13	3174 D2	7156 I10		
2194 F5	3175 A10	7157 I10		
2195 G5	3176 A10	7158 I10		
2196 G5	3177 A11	7159 C13		
2197 G6	3178 A12	7160 C13		
2198 H5	3179 A11	7161 C13		
2199 G2	3180 B12	7162 C13		
2200 C12	3181 I8	7163 C13		
2201 C6	3182 I9	7164 C13		
2202 C6	3183 I9	7165 C13		
2203 C12	3184 I9	7166 C13		
2204 C6	3185 C12	7167 C13		
2205 C6	3186 D12	7168 C13		
2206 C6	3187 I6	7169 D13		
2207 C6	3188 C12	T171 A1		
2208 D2	3189 C12	T172 A3		

Mono Board: Circuit Diagram (Part 2)



2252 A4
2253 C3
2254 C4
2255 C3
2256 C4
2257 C3
2258 C4
2259 D10
2260 D11
2261 D10
2262 D10
2263 D11
2264 D7
2265 D7
2266 F6
2267 F4
2268 F4
2269 F6
2270 F10
2271 F11
2272 H7
2273 H7
2274 F10
2275 F11
2276 F5
3200 A10
3201 A10
3202 A10
3203 B4
3204 B10
3209 B4
3210-1 C2
3210-2 D2
3210-3 E2
3210-4 D2
3211-1 E2
3211-2 C2
3211-3 C2
3211-4 C2
3212-1 C2
3212-2 C2
3212-3 D2
3212-4 D2
3213-1 D2
3213-2 D2
3213-3 D2
3213-4 E2
3214-1 E2
3214-2 E2
3214-3 E2
3214-4 E2
3227 E8
3229 E8
3231 E8
3233 F4
3234 F6
3235 F6
3236 G6
3237 G6
3238 H7
3240 H2
3241 H4
4201 H2
5200 C4
5201 E6
5202 E8
7200 A3
7201 D3
7202 E7
7203 F3
T200 E8
T201 G6
T202 B4
T203 B4
T204 E8
T205 E8
T236 A3
T237 C3
T238 F3
T240 E7

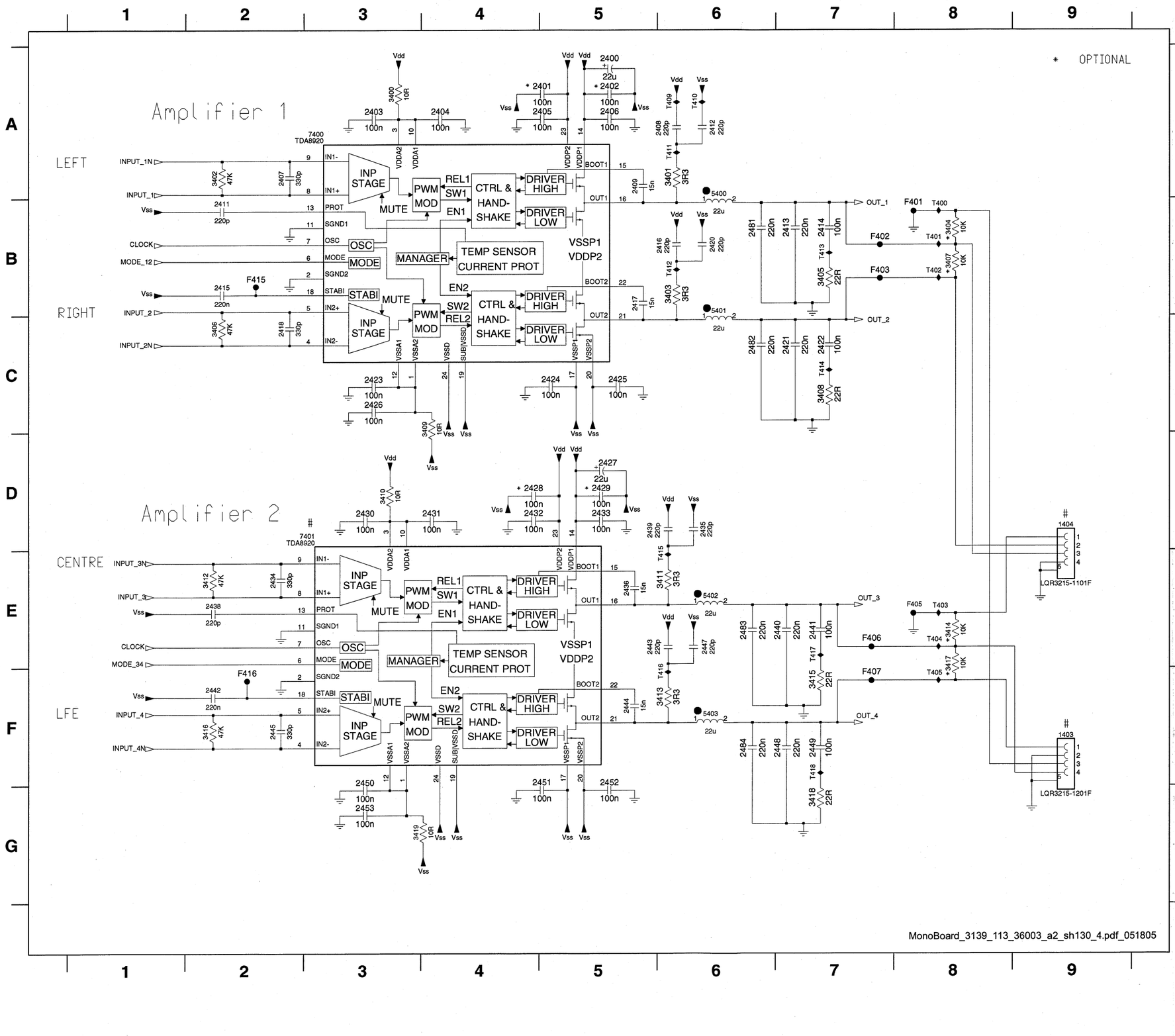
Mono Board: Circuit Diagram (Part 3)



MonoBoard_3139_113_36003_a2_sh130_3.pdf_051805

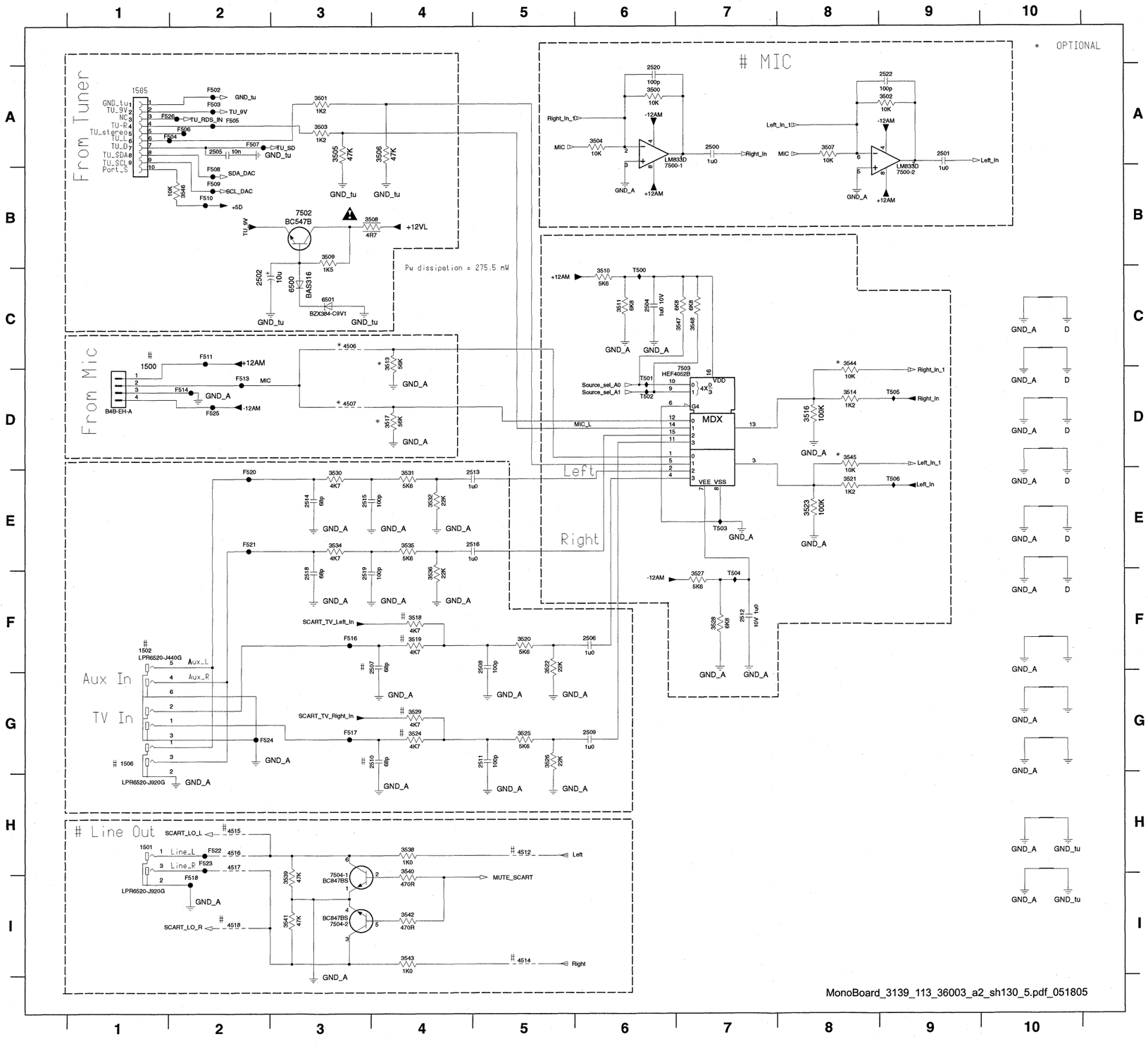
1300 B9
1301 D9
1302 G2
1305 D9
2301 B8
2302 B10
2303 B8
2304 B12
2305 C6
2306 C12
2308 D8
2309 D10
2310 G4
2311 G4
2312 G5
2315 H4
2316 H5
2319 H11
2320 H3
2321 D5
2323 G12
2324 G12
2325 H4
2326 E10
2331 A4
2332 A4
2333 B4
2334 B4
3300 A5
3301 A5
3302 B5
3303 B5
3304 B5
3305 D5
3306 C5
3307 E5
3310 B7
3313 F5
3314 B7
3315 C5
3316 B8
3317 D9
3318 B5
3319 C7
3320 C10
3321 C7
3322 C7
3323 C9
3324 C12
3325 C8
3326 F10
3327 F10
3328 G11
3329 G10
3330 G10
3331 G11
3334 H3
3335 H3
3337 H11
3338 B9
3339 C10
3340 E9
3341 D5
3342 E5
3343 E9
3345 D5
3347 E4
4301 B7
4302 C10
4303 C12
5300 G4
5301 G4
6300 C7
6301 G12
6302 G12
6303 G12
6304 D4
6305 E4
6306 E8
6307 E8
6308 D4
6309 E4
7300 B10
7301-1 B12
7302-1 C8
7302-2 C10
7302-3 C9
7302-4 D8
7302-5 C11
7302-6 D8
7305 D5
7306 C10
7307 E5
7308 E9
7309 G12
7310 G12
F301 C13
F303 G4
F304 G3
F305 G4
F306 G3
F308 G11
T300 B4
T301 D6
T302 D3
T303 E5
T304 E3
T305 G3
T306 G3
T307 G3
T308 G3
T309 G3
T310 G3
T311 C7
T312 G12
T313 E10
T314 E8

Mono Board: Circuit Diagram (Part 4)



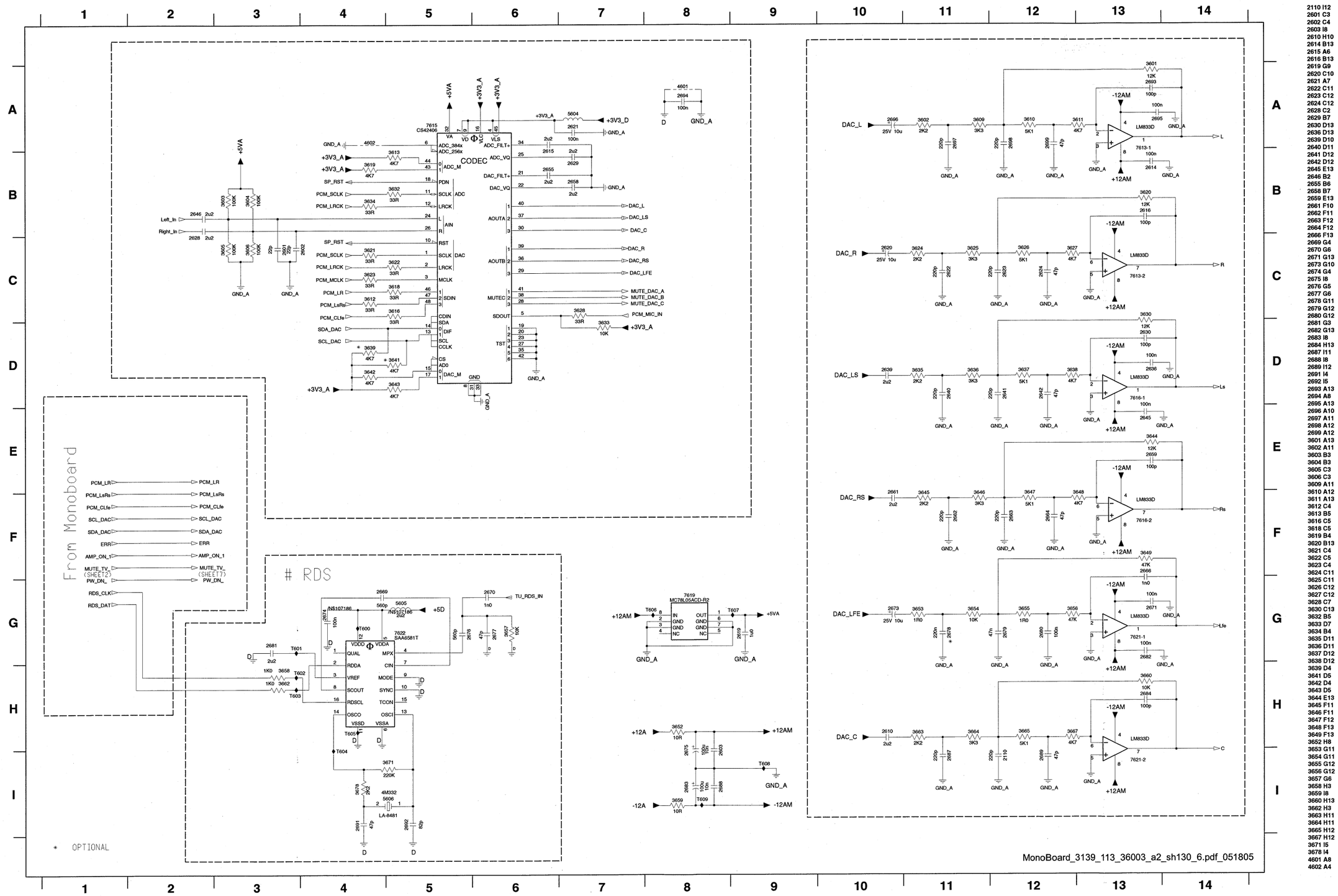
1403 F9 T404 E8
1404 D9 T405 F8
2400 A5 T409 A6
2401 A5 T410 A6
2402 A5 T411 A6
2403 A3 T412 B6
2404 A4 T413 B7
2405 A5 T414 C7
2406 A5 T415 E6
2407 A2 T416 F6
2408 A6 T417 E7
2409 A5 T418 F7
2411 B2
2412 A6
2413 B7
2414 B7
2415 B2
2416 B6
2417 B5
2418 C2
2420 B6
2421 C7
2422 C7
2423 C3
2424 C5
2425 C5
2426 C3
2427 D5
2428 D4
2429 D5
2430 D3
2431 D4
2432 D4
2433 D5
2434 E2
2435 D6
2436 E5
2438 E2
2439 D5
2440 E7
2441 E7
2442 F2
2443 E5
2444 F5
2445 F2
2447 E6
2448 F7
2449 F7
2450 F3
2451 F5
2452 F5
2453 G3
2481 B6
2482 C6
2483 E6
2484 F6
3400 A3
3401 A6
3402 A2
3403 B6
3404 B8
3405 B7
3406 C2
3407 B8
3408 C7
3409 C4
3410 D3
3411 E6
3412 E2
3413 F6
3414 E8
3415 F7
3416 F2
3417 E8
3418 G7
3419 G3
5400 A6
5401 B6
5402 E6
5403 F6
7400 A3
7401 D3
F401 B8
F402 B7
F403 B7
F405 E8
F406 E7
F407 F7
F415 B2
F416 F2
T400 B8
T401 B8
T402 B8
T403 E8

Mono Board: Circuit Diagram (Part 5)



1500 C1
1501 H1
1502 F1
1506 G1
2500 A7
2501 A9
2502 C2
2504 C6
2505 A2
2506 F6
2507 F4
2508 F5
2509 G6
2510 G4
2511 G5
2512 F7
2513 E4
2514 E3
2515 E3
2516 E4
2518 F3
2519 F3
2520 A6
2522 A9
3500 A6
3501 A3
3502 A9
3503 A3
3504 A6
3505 A3
3506 A4
3507 A8
3508 B3
3509 B3
3510 C6
3511 C6
3513 C4
3514 D8
3516 D8
3517 D4
3518 F4
3519 F4
3520 F5
3521 E8
3522 F5
3523 E8
3524 G4
3525 G5
3526 G5
3527 F7
3528 F7
3529 G4
3530 E3
3531 E4
3532 E4
3534 E3
3535 E4
3536 F4
3538 H4
3539 I3
3540 H4
3541 I3
3542 I4
3543 I4
3544 C8
3545 D8
3546 B2
3547 C7
3548 C7
4506 C3
4507 D3
4512 H5
4514 I5
4515 H2
4516 H2
4517 H2
4518 I2
6500 C3
6501 C3
7500-1 A6
7500-2 B9
7502 B3
7503 D7
7504-1 I3
7504-2 I3
F502 A2
F503 A2
F504 A2
F505 A2
F506 A2
F507 A2
F508 B2
F509 B2
F510 B2
F511 C2
F513 D2
F514 D2
F516 F3
F517 G3
F518 I2
F520 E2
F521 E2
F522 H2
F523 H2
F524 G2
F525 D2
F526 A1
T500 C6
T501 D6
T502 D6
T503 E7
T504 F7
T505 D9
T506 E9

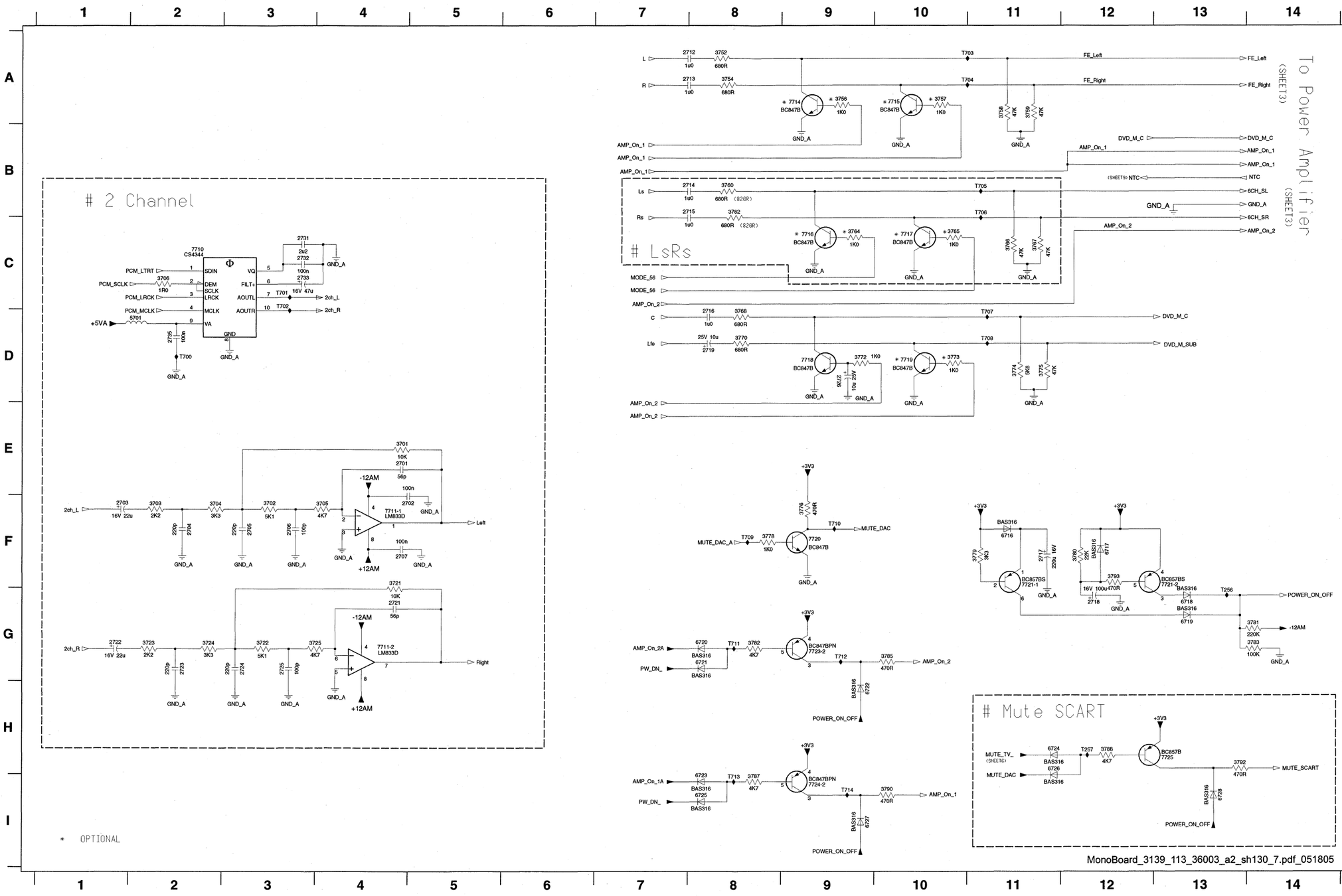
Mono Board: Circuit Diagram (Part 6)



MonoBoard_3139_113_36003_a2_sh130_6.pdf_051805

2110 I12
2601 C3
2602 C4
2603 I8
2610 H10
2614 B13
2615 A6
2616 B13
2619 G9
2620 C10
2621 A7
2622 C11
2623 C12
2624 C12
2628 C2
2629 B7
2630 D13
2636 D13
2639 D10
2640 D11
2641 D12
2642 D12
2645 E13
2646 B2
2655 B6
2658 B7
2659 E13
2661 F10
2662 F11
2663 F12
2664 F12
2666 F13
2669 G4
2670 G6
2671 G13
2673 G10
2674 G4
2675 I8
2676 G5
2677 G6
2678 G11
2679 G12
2680 G12
2681 G3
2682 G13
2683 I8
2684 H13
2687 I11
2688 I8
2689 I12
2691 I4
2692 I5
2693 A13
2694 A8
2695 A13
2696 A10
2697 A11
2698 A12
2699 A12
3601 A13
3602 A11
3603 B3
3604 B3
3605 C3
3606 C3
3609 A11
3610 A12
3611 A13
3612 C4
3613 B5
3616 C5
3618 C5
3619 B4
3620 B13
3621 C4
3622 C5
3623 C4
3624 C11
3625 C11
3626 C12
3627 C12
3628 C7
3630 C13
3632 B5
3633 D7
3634 B4
3635 D11
3636 D11
3637 D12
3638 D12
3639 D4
3641 D5
3642 D4
3643 D5
3644 E13
3645 F11
3646 F11
3647 F12
3648 F13
3649 F13
3652 H8
3653 G11
3654 G11
3655 G12
3656 G12
3657 G6
3658 H3
3659 I8
3660 H13
3662 H3
3663 H11
3664 H11
3665 H12
3667 H12
3671 I5
3678 I4
4601 A8
4602 A4
5604 A7
5605 G5
5606 I5
7613-1 A13
7613-2 C13
7615 A5
7616-1 D13
7616-2 F13
7619 G8
7621-1 G13
7621-2 I13
7622 G5
T600 G4
T601 G3
T602 H3
T603 H3
T604 I4
T605 H4
T606 G8
T607 G9
T608 I9
T609 I8

Mono Board: Circuit Diagram (Part 7)

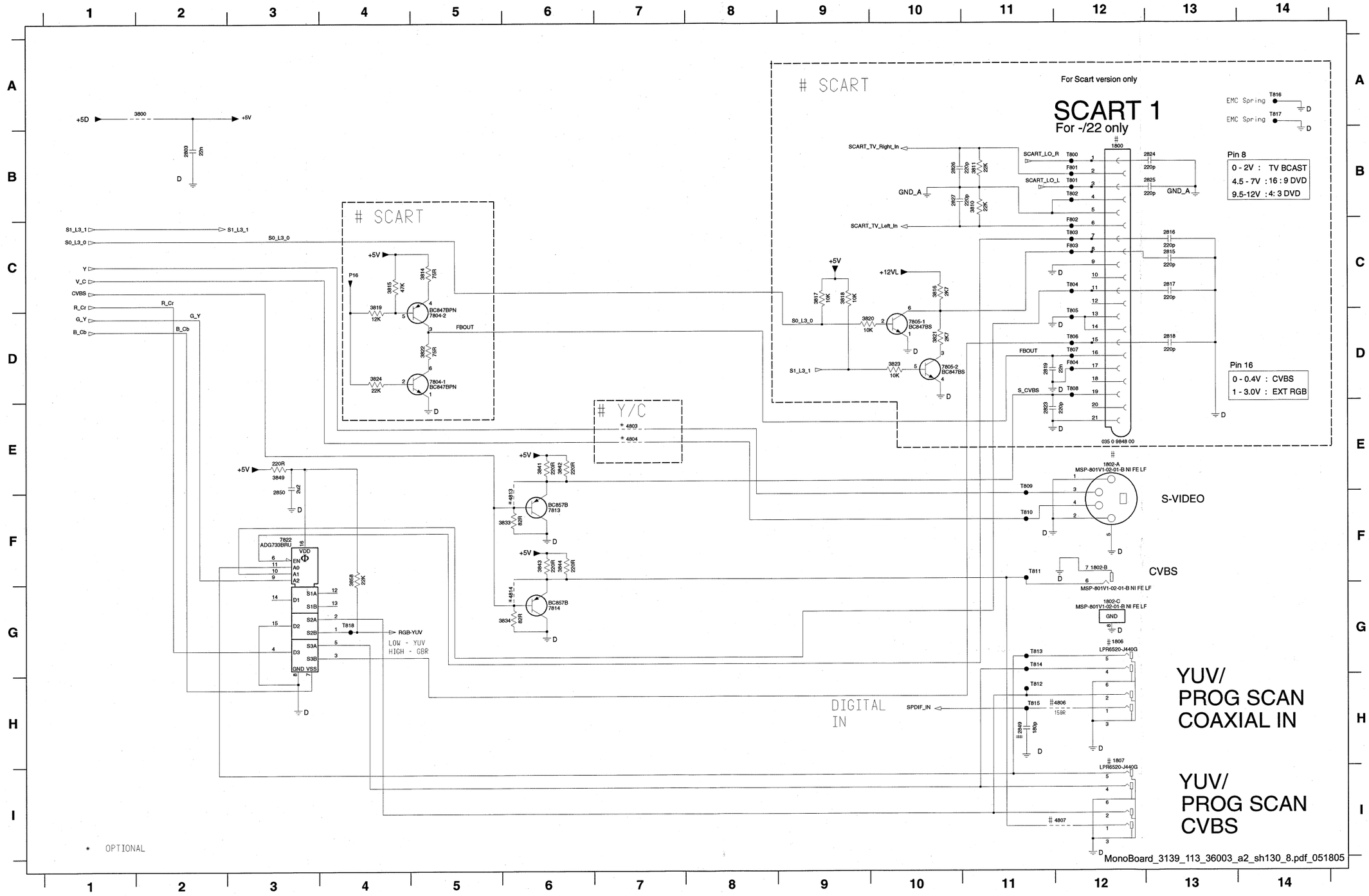


To Power Amplifier (SHEET3)

MonoBoard_3139_113_36003_a2_sh130_7.pdf_051805

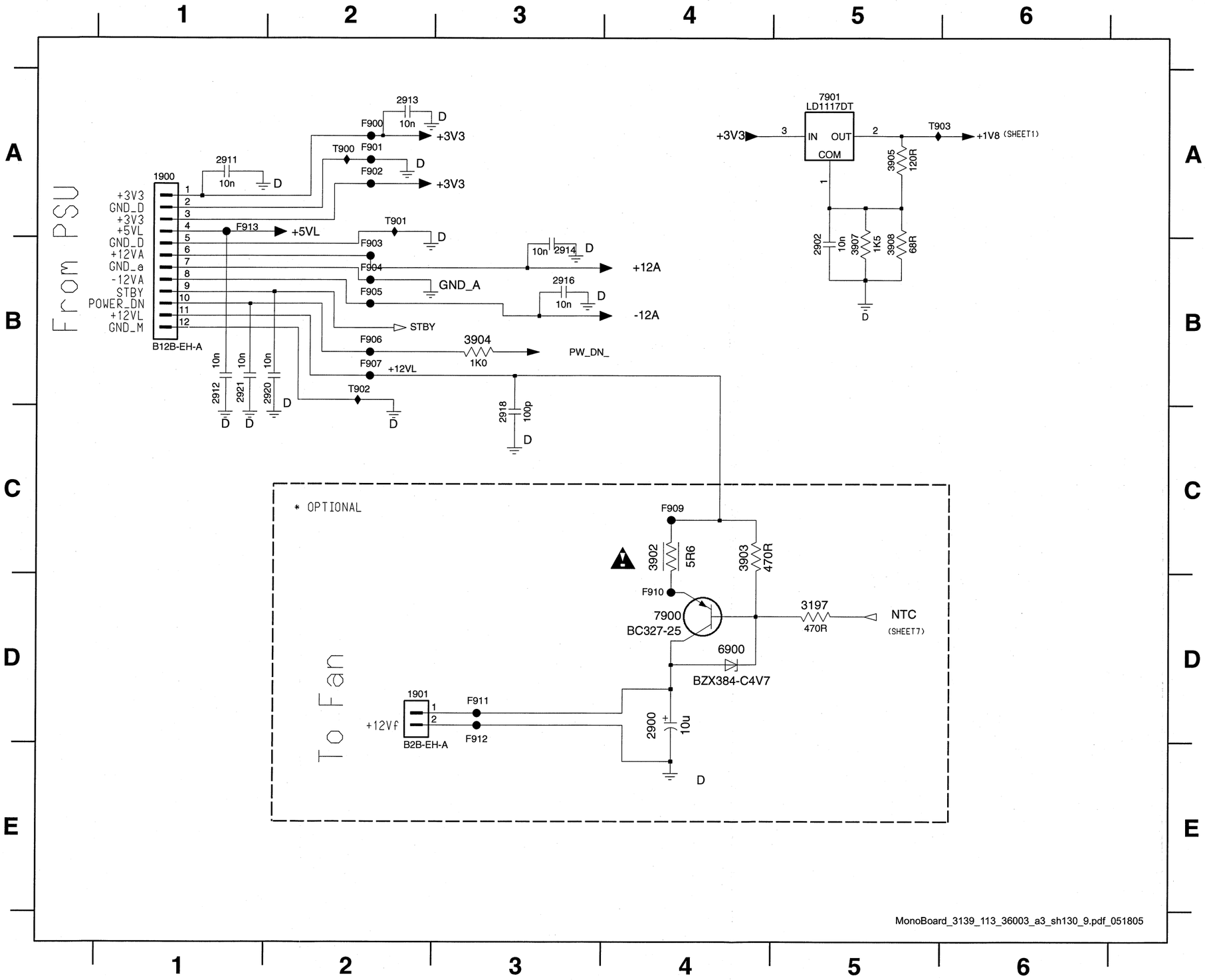
2701 E4
2702 F4
2703 F1
2704 F2
2705 F3
2706 F3
2707 F4
2712 A7
2713 A7
2714 B7
2715 B7
2716 D8
2717 F11
2718 G12
2719 D8
2721 G4
2722 G1
2723 G2
2724 G3
2725 G3
2726 D9
2731 C3
2732 C3
2733 C3
2735 D2
3701 E4
3702 F3
3703 F2
3704 F2
3705 F4
3706 C2
3721 F4
3722 G3
3723 G2
3724 G2
3725 G3
3752 A8
3754 A8
3756 A9
3757 A10
3758 A11
3759 A11
3760 B8
3762 B8
3764 C9
3765 C10
3766 C11
3767 C11
3768 D8
3770 D8
3772 D9
3773 D10
3774 D11
3775 D11
3776 F9
3778 F8
3779 F11
3780 F12
3781 G14
3782 G8
3783 G14
3785 G10
3787 I8
3788 H12
3790 I10
3792 H13
3793 F12
5701 D2
6716 F11
6717 F12
6718 G13
6719 G13
6720 G8
6721 G8
6722 H9
6723 I8
6724 H11
6725 I8
6726 H11
6727 I9
6728 I13
7710 C2
7711-1 F4
7711-2 G4
7714 A9
7715 A10
7716 C9
7717 C10
7718 D9
7719 D10
7720 F9
7721-1 F11
7721-2 F13
7723-2 G9
7724-2 I9
7725 H13
T256 G13
T257 H12
T700 D2
T701 C3
T702 C3
T703 A10
T704 A10
T705 B11
T706 B11
T707 D11
T708 D11
T709 F8
T710 F9
T711 G8
T712 G9
T713 I8
T714 I9

Mono Board: Circuit Diagram(Part 8)



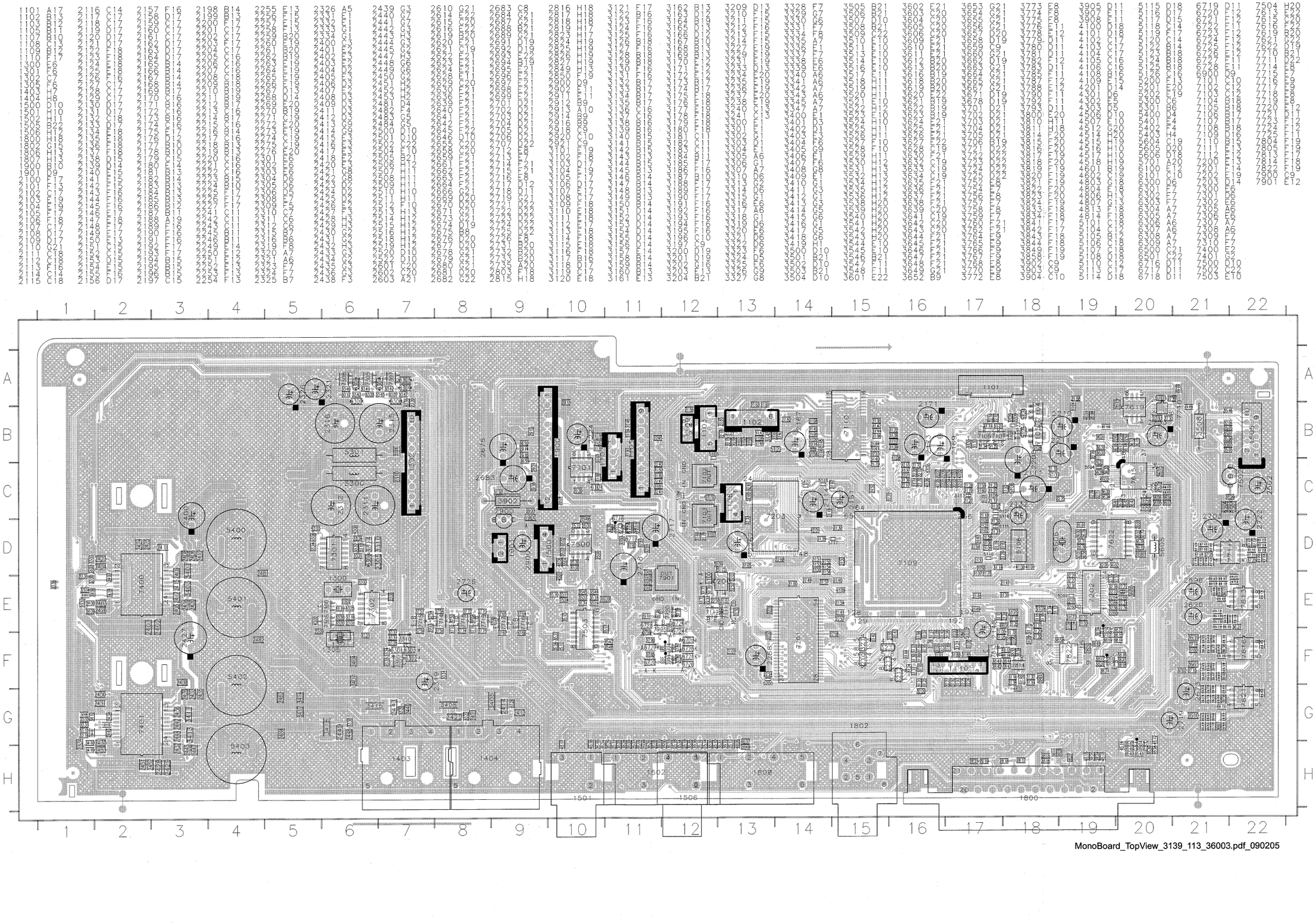
1800 B12
1802-A E12
1802-B F12
1802-C G12
1806 G12
1807 H12
2803 B2
2815 C13
2816 C13
2817 C13
2818 D13
2819 D11
2823 E11
2824 B13
2825 B13
2826 B10
2827 B10
2849 H11
2850 E3
3800 A2
3810 B11
3811 B11
3814 C5
3815 C4
3816 C10
3817 C9
3818 C9
3819 C4
3820 D9
3821 D10
3822 D5
3823 D10
3824 D4
3833 F6
3834 G6
3841 E6
3842 E6
3843 F6
3844 F6
3849 E3
3858 F4
4803 E7
4804 E7
4806 H12
4807 I12
4813 F6
4814 G6
7804-1 D5
7804-2 D5
7805-1 D10
7805-2 D10
7813 F6
7814 G6
7822 F3
F801 B12
F802 C12
F803 C12
F804 D12
T800 B12
T801 B12
T802 B12
T803 C12
T804 C12
T805 D12
T806 D12
T807 D12
T808 D12
T809 E11
T810 F11
T811 F11
T812 H11
T813 G11
T814 G11
T815 H11
T816 A14
T817 A14
T818 G4

Mono Board: Circuit Diagram (Part 9)



1900 A1
1901 D2
2900 D4
2902 B5
2911 A1
2912 B1
2913 A2
2914 B3
2916 B3
2918 C3
2920 B2
2921 B1
3197 D5
3902 C4
3903 C4
3904 B3
3905 A5
3907 B5
3908 B5
6900 D4
7900 D4
7901 A5
F900 A2
F901 A2
F902 A2
F903 B2
F904 B2
F905 B2
F906 B2
F907 B2
F909 C4
F910 D4
F911 D3
F912 D3
F913 A1
T900 A2
T901 A2
T902 B2
T903 A5

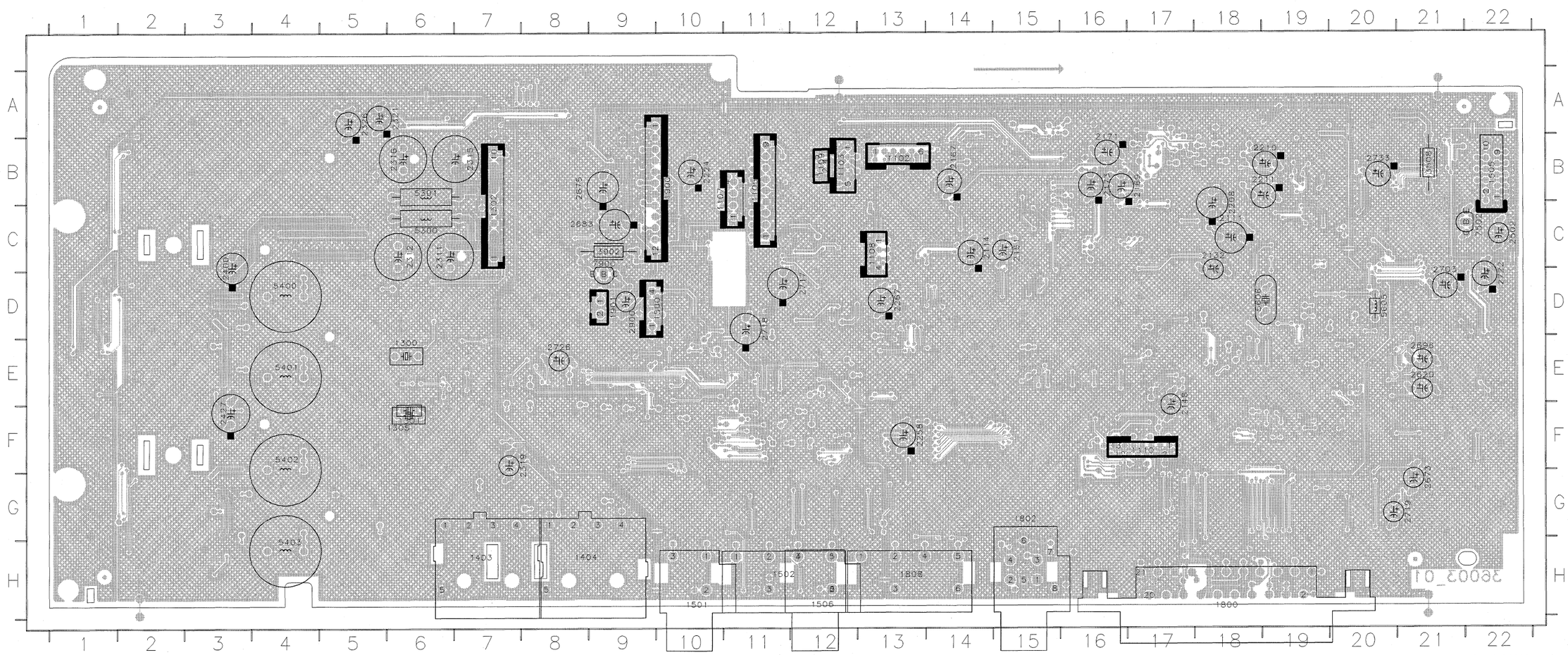
Layout: Mono Board (Topview)



MonoBoard_TopView_3139_113_36003.pdf_090205

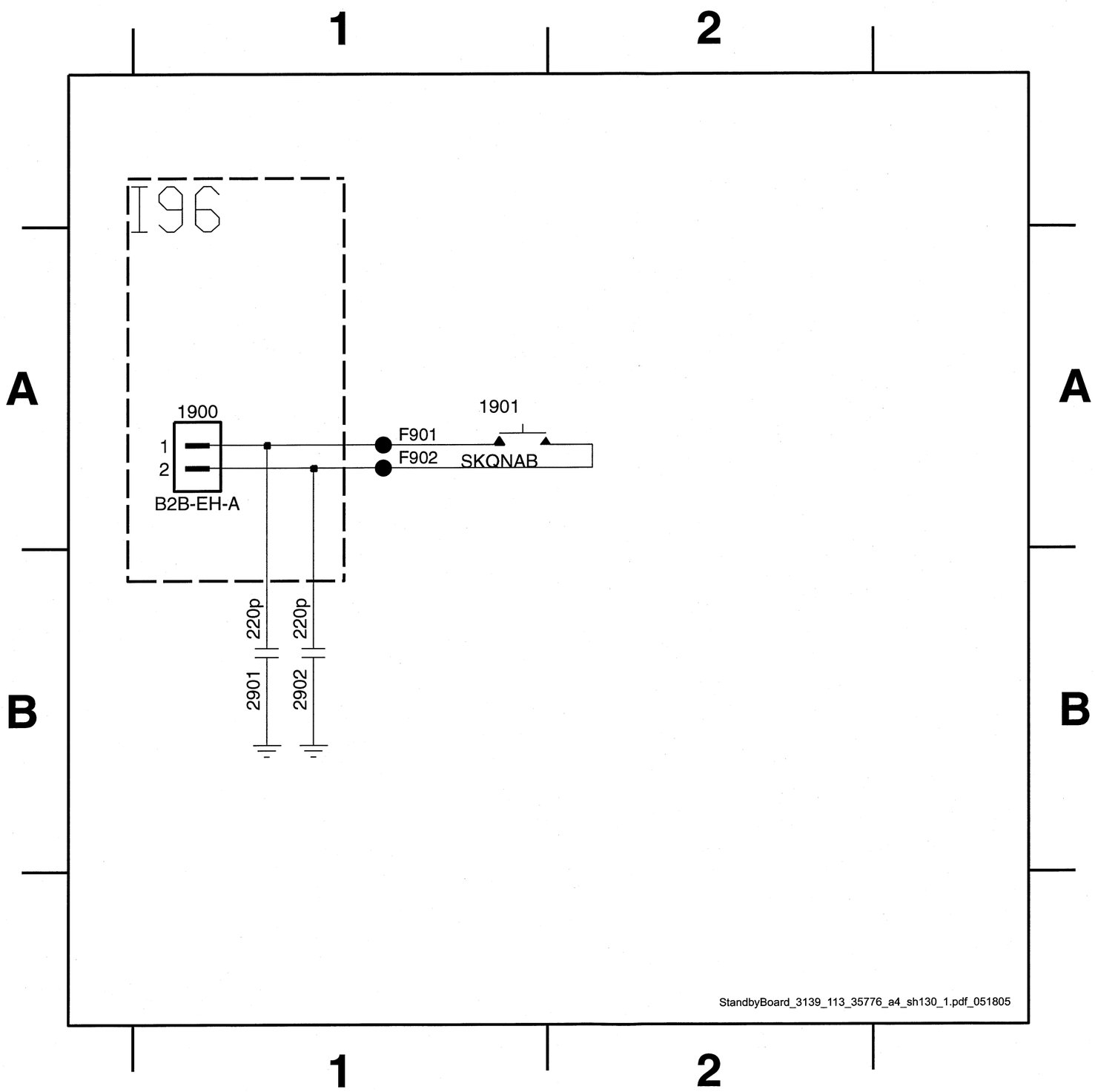
Layout: Mono Board (Bottom view)

1102 B13 1103 B12 1105 B11 1107 B10 1108 C13 1109 B12 1110 F17 1300 E6 1301 F6 1302 C7 1305 F6 1403 H7 1404 H8 1500 D10 1501 H10 1502 H11 1505 B22 1506 H12 1800 H18 1802 G15 1806 H13 1807 H13 1900 B10 1901 D9 2111 C18 2114 C14 2132 C18 2148 F17 2151 C15 2167 B14 2169 B17 2171 B16 2173 B16 2208 C18 2210 B19 2211 B19 2224 B10 2258 F13 2267 D13 2311 C6 2312 C6 2315 B7 2316 B6 2319 F8 2321 A6 2326 A5 2400 C3 2427 F3 2502 C22 2620 E21 2675 G21 2675 B8 2683 C8 2696 E21 2703 D21 2717 D12 2718 D11 2719 G21 2722 D22 2726 E8 2733 B20 2900 D9 3508 E21 3902 C9 5300 C6 5301 B6 5400 D4 5401 E4 5402 F4 5403 H4 5605 D20 5606 D18 7502 C22 7900 C9

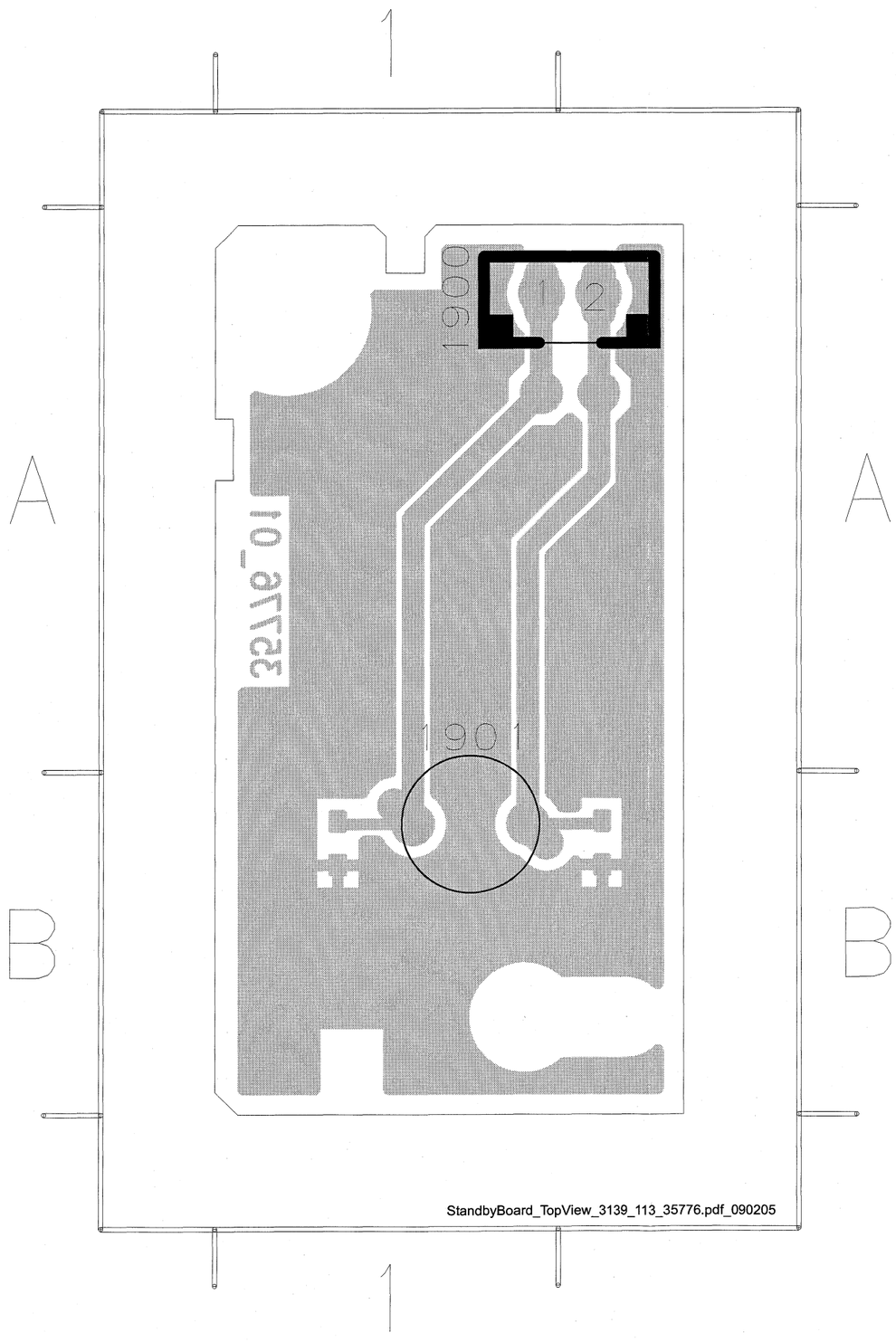


Standby Board: Circuit Diagram

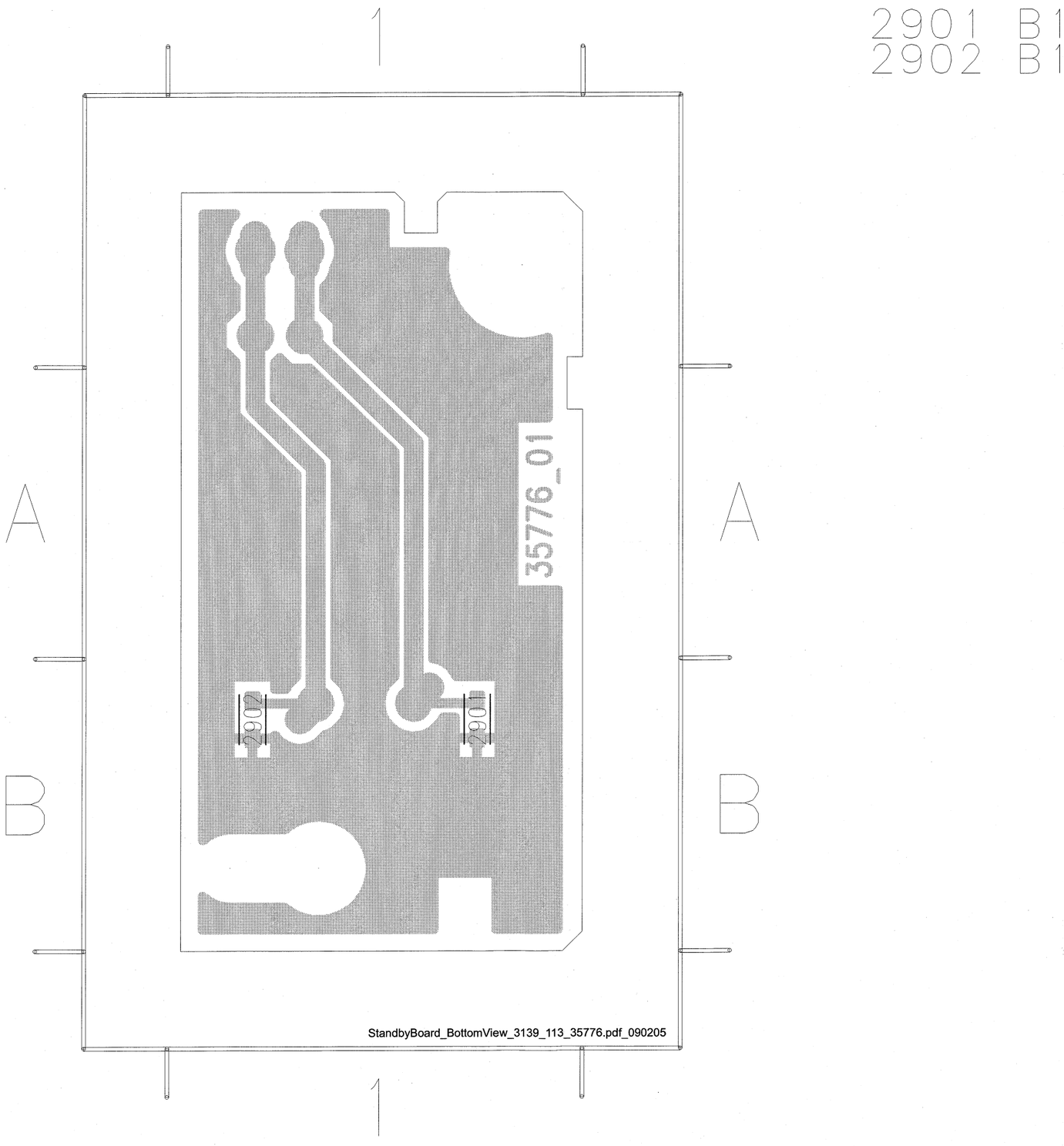
1900 A1
1901 A1
2901 B1
2902 B1
F901 A1
F902 A1



Layout: Standby Board (Topview)

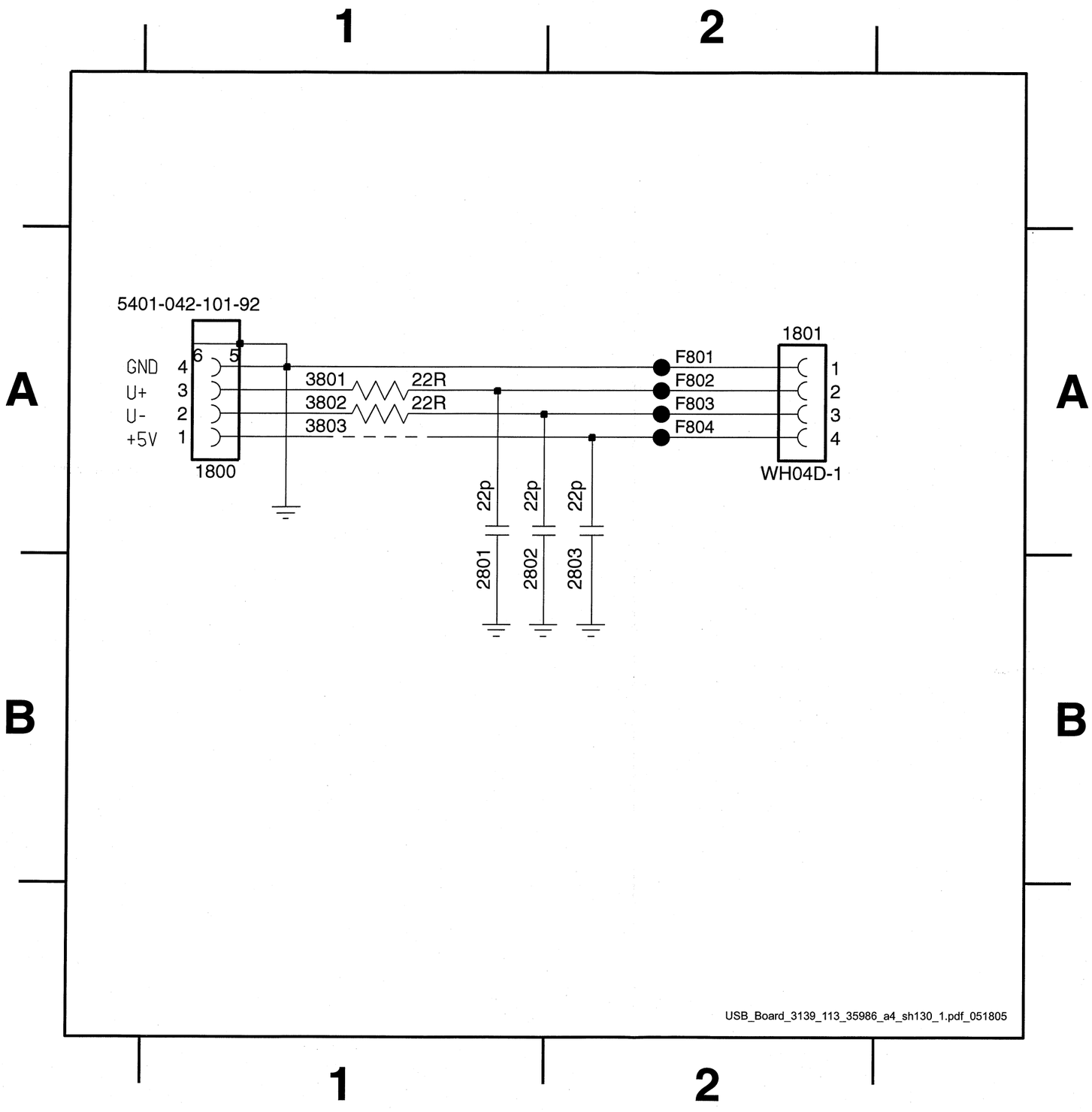


Layout: Standby Board (Bottom view)



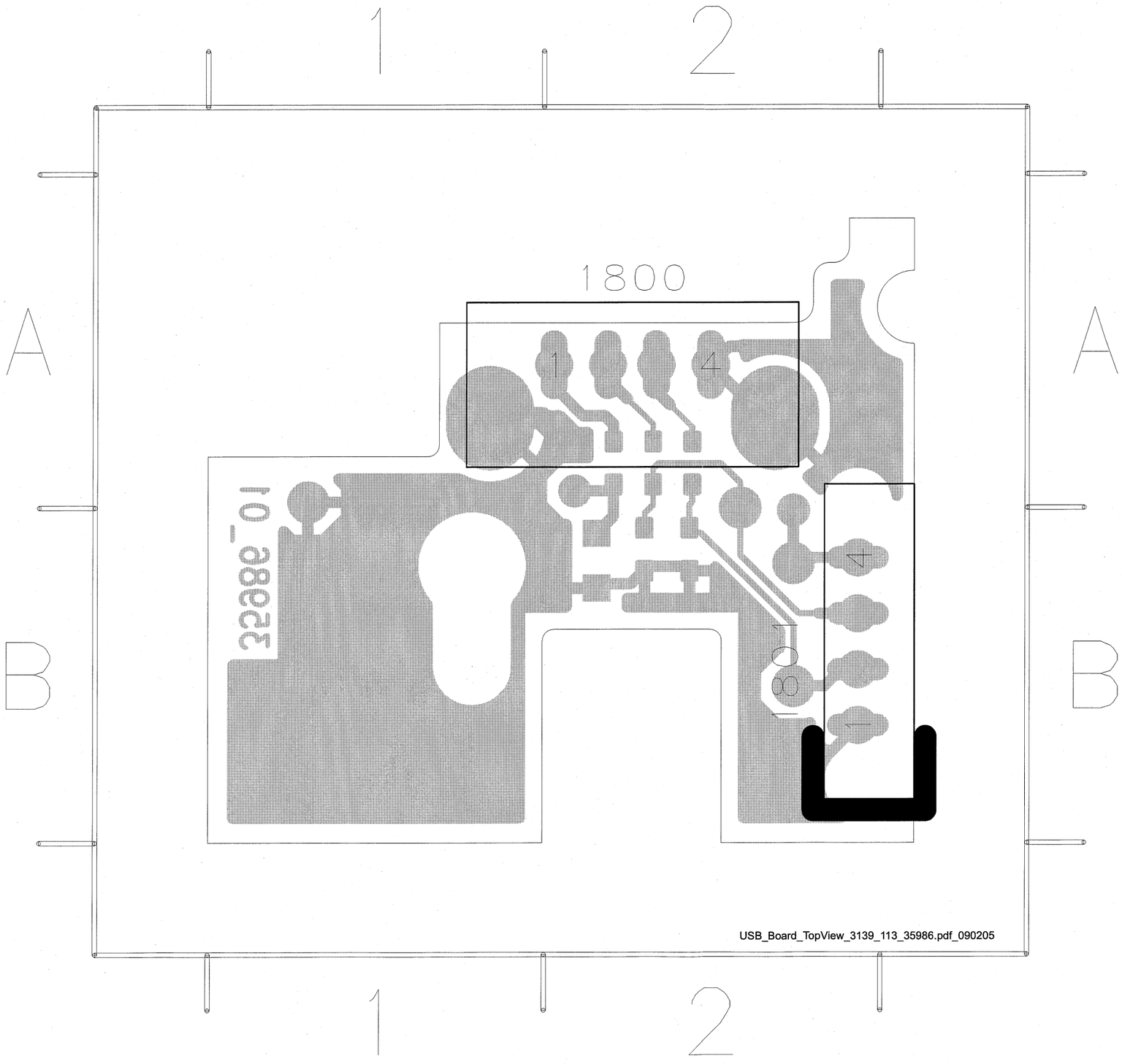
StandbyBoard_BottomView_3139_113_35776.pdf_090205

USB Board: Circuit Diagram



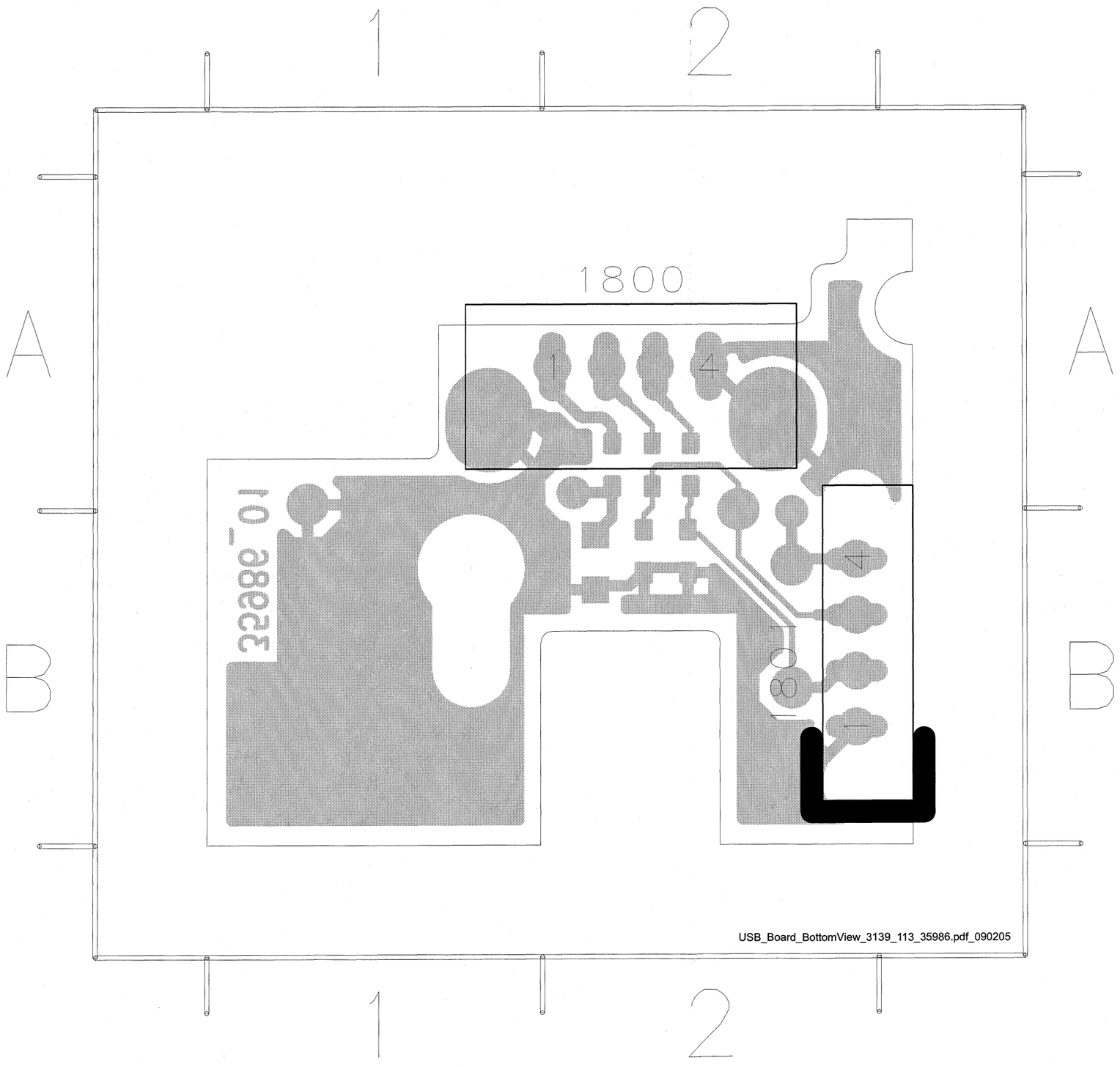
1800 A1
1801 A2
2801 B1
2802 B1
2803 B2
3801 A1
3802 A1
3803 A1
F801 A2
F802 A2
F803 A2
F804 A2

Layout: USB Board (Topview)



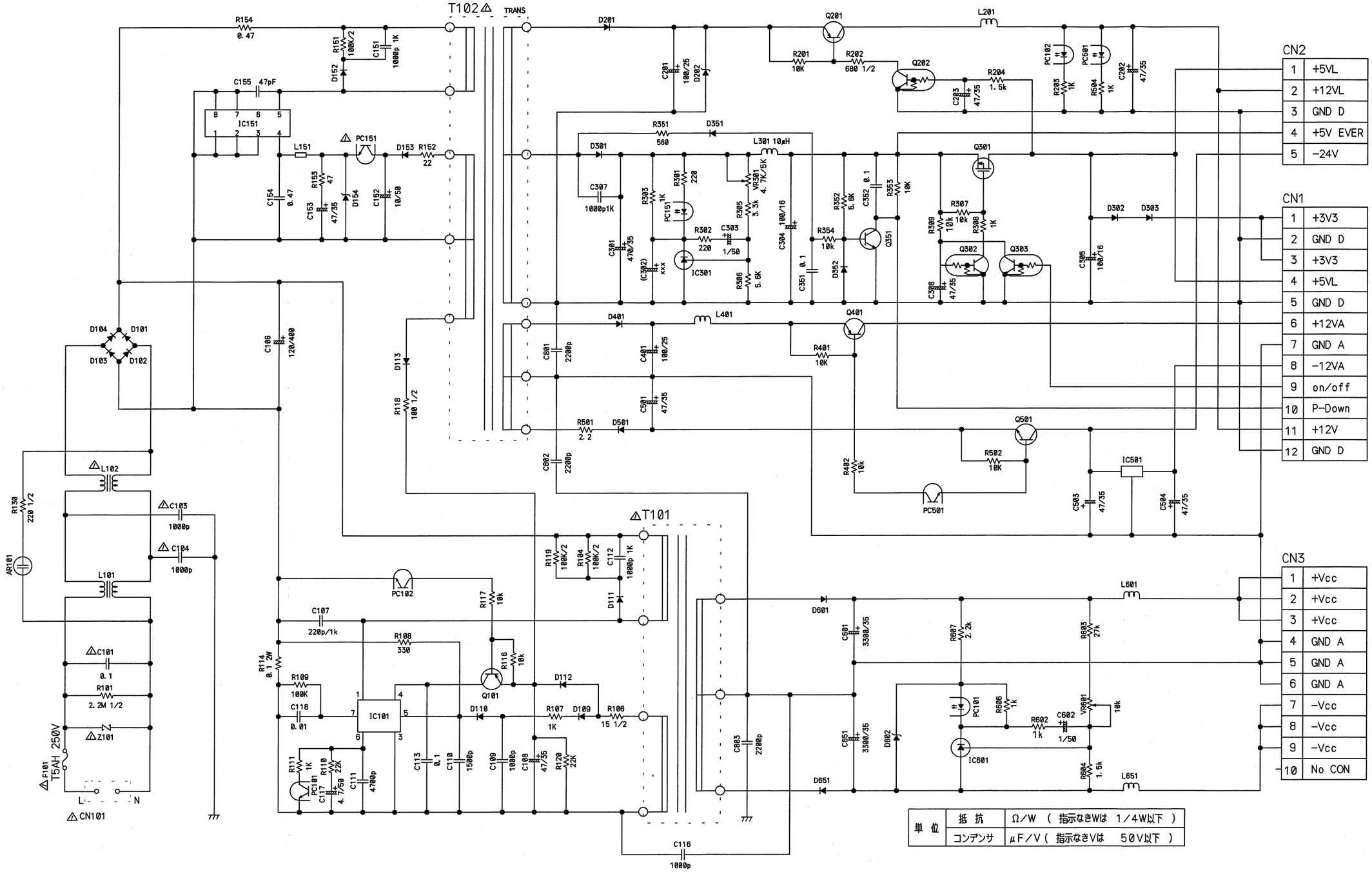
USB_Board_TopView_3139_113_35986.pdf_090205

Layout: USB Board (Bottom view)



USB_Board_BottomView_3139_113_35986.pdf_090205

PSU Circuit Diagram (For information only)



( ) : no stuff

Notes:

9. Exploded View of the Set

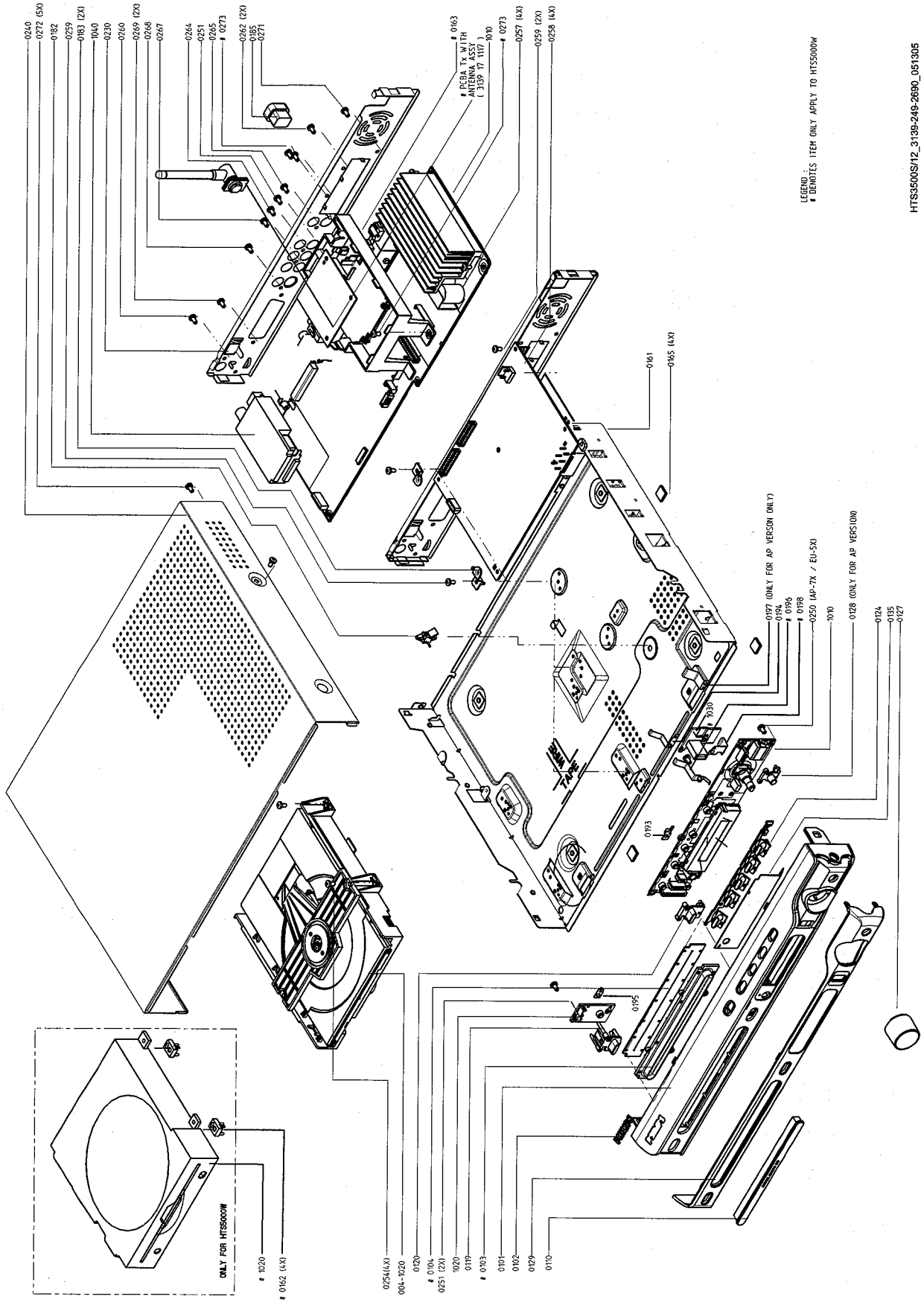
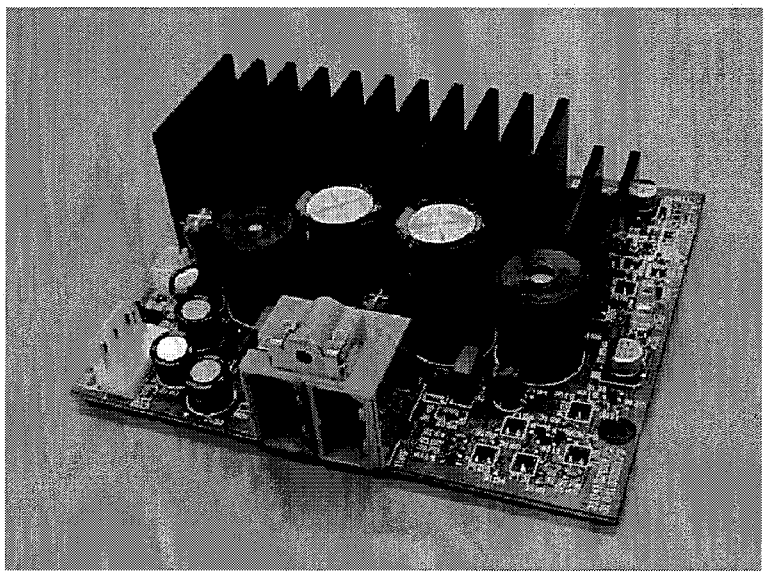


Figure 8-1

Module PWR 04-01 Non-Wireless (For Information Only)



1 Overview - introduction

This wireless audio amplifier is a Stereo 2 x 50 Watt class D amplifier for use in Wireless Audio Sets. The FR4 PCB is build up with through hole components and SMD 0603, 0805 components. Volumecontrol is done with a unidirectional serial signal from the receiver towards the M62429 volumechip. A black extruded AL heatsink (4°C/W) is mounted on the amplifierchip with 2 screws. On board is also all conditioning for the wireless receivermodule from Freesystems. Power supply and interfacing from / to the receiver is done with a 16 pole FFC flexlink. Also on board are 2 LEDS to indicate the operating condition of the amplifier.

2 Electrical specification

Rated Power	2 x 50W in 6 Ohm @ 10%THD maximum (FTC)
Sensitivity (2 x 50 W)	0.5 V RMS input for 50Watt into 6 ohm / see annex 1: FTC - power
THD	<0.1% at 1/8 P rated (each channel separately measured)
Frequency response	flat between 30Hz - 20kHz // +/- 1 dB
Phase	Input and output in phase
Typical DC – supply	+ 27 VDC / -27 VDC & 6VDC
Load output	6 ohm - Both channels should be loaded with 6 ohms to avoid audioholes
Mute input	Active low
Standby input	Active low
Leds	Green = playmode or muted // red is standbymode
Standby output to SMPS	active high (6V unloaded) = SMPS in standbymode
Input impedance	< 20K ohm both channels

Output of amplifier is short circuit proof
No audible plops at power on or power down

Operating temperature:	0 to + 45 °C
Storage temperature	-25 to + 80 °C
Pcb material	FR4 / 2 layers / 0603, 0805 & through hole / Dimensions 90 x 100 mm

PB – free components and full pB free processing

3 Key components

class D amplifier: TDA8920BTH / Philips Semiconductor
outputfilter: 22µH / 470nF polyester
Conditioning preamp: NJM4560 / JRC
Volumechip: M62429 / Renesas – Mitsubishi
3V3 regulator: MC78FC33 / Motorola
Connectors : all JST except speakerconnector
Output to speakers: Easyconnector LQR3215-0102F / SMK

4 Introduction & definitions

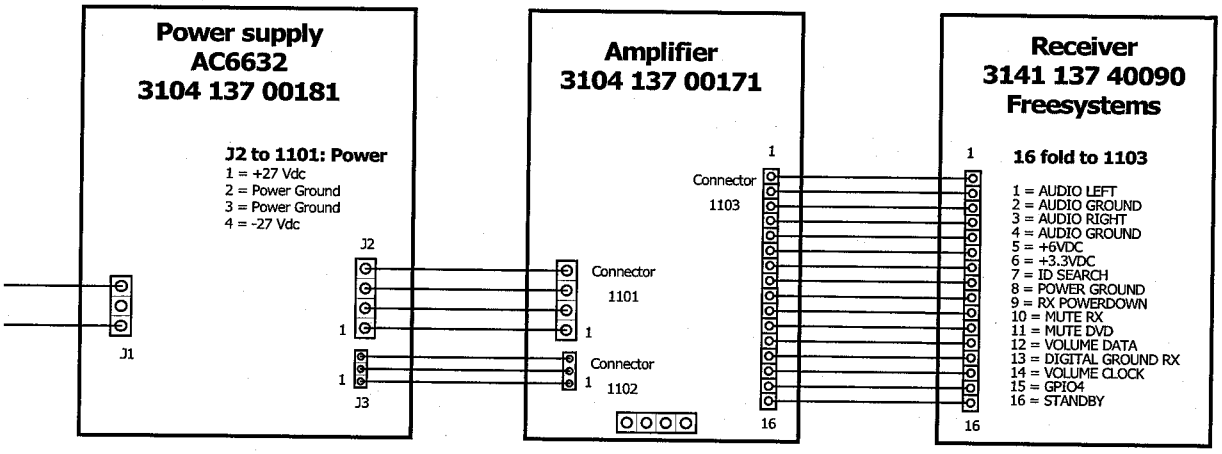
This amplifier delivers 2 x 50 watts into 6 ohm loads. It is intended for a wireless surround system containing transmitter coupled to a DVD main set and a so called receiver-amplifierunit.
Audiotransmission is purely digital and done on 2.4Ghz with "Polaris 2" TX and RX modules from Freesystems.

The amplifier powersupply combination can deliver continuously 1/8 of the 2 x 50 watts into 6 ohm loads. Regarding FTC rules: the amplifier can deliver 1 x 50 Watts in left or right channel for 5 minutes (only one channel driven) after a period of preheating for 1 hour on 1/8 of 50 watts in each channel.
Full power: 50 Watts in 6 ohm = 17.3 Vrms
1/8 of full power : 6.25 Watts in 6 ohm = 6.12 Vrms

The amplifier has a built in highpass filter (around JRC 4560 opamp) and volumecontrol with M62429 chip from Renesas. One has to use the by PSS developed tool to give the correct serial data to the volumechip, otherwise no testing is possible. (testtool 3104 137 00231)
Also, before connecting the amplifier to the power supply and applying inputsignals, be sure that the heatsink is mounted. (in all other cases excessive temp-rise and thermal shutdown of the TDA8920TH is possible)

*** See below picture / schematic to have an idea how the final receiverset is built up using amplifier 3104 137 0017

Connectiondiagram
Amplifier - receiver assy HTS5000



J1: Mains input
1 = N
2= not connected
3 = L

J3 to 1102: 6Vdc
1 = + 6 Vdc
2 = GND 6 Vdc
3 = control (high = standby)

1100:
speaker - out

Blue: left +
Black: left -

Grey: right +
Black: right -

5 Overview of Testpoints

F1	AUDIO LEFT IN
F2	AUDIO GROUND
F3	AUDIO RIGHT IN
F4	AUDIO GROUND
F5	+6VDC
F6	+3.3VDC
F7	ID SEARCH *
F8	POWER GROUND RX
F9	POWERDOWN *
F10	MUTE RX *
F11	MUTE DVD *
F12	VOLUME DATA
F13	DIGITAL GROUND RX
F14	VOLUME CLOCK
F15	GPIO4 *

F16	STANDBY *
F17	+POWER (27Vdc)
F18	GROUND POWER
F19	-POWER (-27Vdc)
F20	+6VDC IN
F21	GROUND 6Vdc
F22	STBY_OUT
F23	RIGHT OUT SPEAKER
F24	LEFT OUT SPEAKER
F25	GROUND OUT
F26	GREEN LED
F27	RED LED
F28	MUTE ALL
F29	6V DETECT
F30	IN RIGHT

F31	IN LEFT
F32	+5Vdc
F33	VOL_CLK
F34	VOL_DAT
F35	+15Vdc
F36	-15Vdc
F37	IN RIGHT TDA
F38	IN LEFT TDA
F39	MODE AMP
F40	- ANALOG
F41	+ ANALOG
F42	- POWER TDA
F43	+ POWER TDA

F1 to F16 correspond with the pinning of connector 1103
*F7, F15 are not used in the application
*F9, F10, F11, F16 are active low signals // see also all info on the Freesystems modules (document PRD017002)
F22 is active high (high = switch off the main supply +/-27Vdc)

6 Test Setup and start up

Input signals are generated by an audio sine-signal generator with Z_out < 600 ohms.

Power supply voltages to the PCB:

F17	+POWER (27Vdc)
F18	GROUND POWER
F19	-POWER (-27Vdc)

F20	+6VDC IN
F21	GROUND 6Vdc

Speaker outputs should be loaded with 6 ohm / minimum 50 Watt resistors.

F23	RIGHT OUT SPEAKER
F24	LEFT OUT SPEAKER
F25	GROUND OUT

Use the dedicated PSS testtool **3104 137 00231** to control all inputs of the amplifier.
*** See annex for more info on 3104 137 00231 ****
Also, the by PSS developed software (serial data – tool) has to be used to control the serial data and clock towards the volumechip. (via DB9 serial cable towards any IBM PC)
DTR = clock = pin 4 of DB9
RTS = DATA = pin 7 of DB9
This testtool has on board loads 50 ohms for the 6Vdc and 100 ohms for the 3.3Vdc.
Two cinch connectors are forseen to connect an audiosource with Zout<600ohms
Mute and standby can be simulated on this testboard. (with switches or with relay's to an automated testsystem)
See overview of testpoints for better understanding.

Best condition is to start every testsequence with F16 (Standby) and also both Mutelines F10, F11 low. This gives a minimum load startup condition. Initially, at first startup, the volumechip will be on maximum attenuation (-80dB), so no sound will come out of the amplifier. However, after disconnecting and again connecting the amplifier to the powersupply , the volumechip "can" be on the last initial setting, but this is not always the case. So, it is best to load a certain "save" attenuation (-50dB) towards the amplifier at startup. (startup = amp muted and / or standby)

Be sure the heatsink is mounted in the correct way.

7 DC MEASUREMENTS

Pcb connected to the testtool, all supplies connected as described above
No audioinput signals to the PCB.
F1 an F3 to ground (Audio inputs)
F10 (standby), F11 (mute DVD), F16 (mute RX) low at startup by use of the switches on the tool

Static DC measurements. (all values Vdc)

	F32 +5Vdc	F35 +15Vdc	F36 -15Vdc	F6 +3.3Vdc	F34 VOL_DAT	F33 VOL_CLOCK	F29 6V DETECT	F9 POWERDOWN
Typical	5.4	15.7	-15.7	3.25	0.3	0.3	0	3.1
Lower Limit	5.2	15	-15	3.1	0	0	0	2.9
Higher Limit	5.6	16.4	-16.4	3.5	0.45	0.45	0.1	3.3

Values below valid if the +5 is 5.4 Vdc typical.

	F30 In Right	F31 In Left	F37 IN Right TDA	F38 IN Left TDA
Typical	2.65	2.65	0	0
Lower Limit	2.2	2.2	-0.1	-0.1
Higher Limit	2.8	2.8	0.1	0.1

Dynamic DC measurements / Mute and Standby. (all values Vdc)

Condition	F39 MODE AMP	F28 MUTE ALL	F22 STBY OUT	F26 GREEN LED	F27 RED LED	F29 6V DETECT	F9 POWER DOWN	LIMITS
F16 low F10, F11 low (Standby, muted)	**0.25**	**3.2**	**6**	**4.22**	**0.1**	**0.1**	**3.1**	**Typical**
	0	2.9	5.7	3.8	0			Lower
	0.4	3.5	6	4.5	0.3			Higher
F16 to 3.3Vdc F10, F11 low (Amp on, but muted)	**2.5**	**3.2**	**0.1**	**0.1**	**4.5**	**0.1**	**3.1**	**Typical**
	2.2	2.9	0	0	3.8			Lower
	2.7	3.5	0.3	0.3	4.7			Higher
F16 to 3.3Vdc F10, F11 to 3.3Vdc (Amp on, demuted, playmode)	**5**	**0.1**	**0.1**	**0.1**	**4.5**	**0.1**	**3.1**	**Typical**
	4.6	0	0	0	3.8			Lower
	5.3	0.3	0.3	0.3	4.7			Higher
Condition: Amplifier in Play mode **Action: Switch off the + 27v dc supply and check the levels on F39 (MODE_AMP)**	**2.5**							**Typical**
	2.2							Lower
	2.7							Higher
Condition: Amplifier powered **Action: Connect F9 to ground F13 and check if a puls appears on F29 (this test to be done on samplebase)**						**Puls 0.7 Vdc 15mSec**	**0**	**Typical**
						Puls 0.7 Vdc 10mSec	0	Lower
						Puls 0.7 Vdc 20mSec	0	Higher

Dynamic DC measurements - currentconsuption / Mute and Standby. (all values mA DC)
(amplifierpcb loaded with 100 Ohm on F6 (3.3Vdc) and 50 Ohm on F5 (6VDC) // no audio input

Condition	Current in + 27Vdc	Current in - 27Vdc	Current in + 6Vdc	LIMITS
F16 low F10, F11 low (Standby, muted)	**13**	**17**	**170**	**Typical**
	10	10	160	Lower
	20	22	180	Higher
F16 to 3.3Vdc F10, F11 low (Amp on, but muted)	**80**	**84**	**173**	**Typical**
	72	75	171	Lower
	87	90	175	Higher
F16 to 3.3Vdc F10, F11 to 3.3Vdc (Amp on, demuted, playmode)	**88**	**80**	**172**	**Typical**
	80	75	170	Lower
	100	95	175	Higher

Dynamic DC measurements / Serial communication (all values Vdc)
The below table is valid if the 5Vdc supply is at its typical value of 5.4Vdc

Condition	F34 VOL_DAT	F33 VOL_CLOCK	F32 +5Vdc	LIMITS
F12 DATA F14 CLOCK To F13 Ground with 330 ohms series resistor	**0.3**	**0.3**	**5.4**	**Typical**
	0	0	5.6	Lower
	0.45	0.45	5.2	Higher
F12 DATA F14 CLOCK To F6 3.3 Vdc	**5.3**	**5.3**	**5.4**	**Typical**
	5.1	5.1	5.6	Lower
	5.5	5.5	5.2	Higher

Also read the datasheets of the M62429 for better understanding
For good serial communication to the Renesas chip:
The "low" level of Data and Clock should be max 0.2 x VCC
The "high" level of Data and Clock should be minimum 0.8 x VCC
(Reflected to our application: low level < 1.08 Vdc and high level > 4.3Vdc)

8 AUDIO MEASUREMENTS

***** Measurements done with LP filter 24dB / octave / 30kHz except otherwise indicated**
(all voltages are RMS values)

Attenuator M62429 is set to 0dB			
	Input with testtool to 1103 pin 1 and 1103 pin 3	Measure on load of 6 ohm / 50 Watt	
		1100 R_speaker-out	1100 L_speaker-out
SENSITIVITY 1KHz	250 mV	9 V ± 0.25V	9 V ± 0.25V
SENSITIVITY 15kHz	250 mV	9.25 V ± 0.25V	9.25 V ± 0.25V
FREQUENCY RESPONSE		**9V = 0dB**	**9V = 0dB**
50Hz	250 mV	-0.7 ± 0.5dB	-0.7 ± 0.5dB
100Hz	250 mV	0 ± 0.5dB	0 ± 0.5dB
1KHz	250 mV	0 ± 0.5dB	0 ± 0.5dB
10KHz	250 mV	0 ± 0.5dB	0 ± 0.5dB
20KHz	250 mV	-0.25 ± 0.5dB	-0.25 ± 0.5dB
DISTORTION @ 1/8 P rated 1KHz	170mV	6.2Vrms THD<0.25%	6.2Vrms THD<0.25%
OUTPUT POWER 1KHz	500 mV RMS	18 Vrms @ THD <=10%	18 Vrms @ THD <=10%
RESIDUAL VOLTAGE (Approx 315 kHz) No filter applied	Input shorted	< 0.7 V	< 0.7 V
RESIDUAL VOLTAGE (filter as above described applied)	Input shorted	< 1 mV	< 1 mV

***** Measurements done with LP filter 24dB / octave / 30kHz except otherwise indicated**
(all voltages are RMS values)

Inputsignal is set to 500mV 1Khz			
Attenuatorsetting ***	**Input with testtool to 1103 pin 1 and 1103 pin 3**	**Measure on load of 6 ohm / 50 Watt**	
		1100 RIGHT speaker out	**1100 LEFT speaker out**
LEFT & RIGHT 0dB	250 mV	9 V ± 0.25V	9 V ± 0.25V
LEFT 0dB RIGHT -80dB	250 mV	< 5mV	9 V ± 0.25V
RIGHT 0dB LEFT -80dB	250 mV	9 V ± 0.25V	< 5mV
LEFT OdB RIGHT 6DB	250 mV	4.5 V +/-0.2V	9 V ± 0.25V
LEFT 6dB RIGHT 0DB	250 mV	9 V ± 0.25V	4.5 V +/-0.2V
LEFT -6dB RIGHT -6DB	250 mV	4.5 V +/-0.2V	4.5 V +/-0.2V
LEFT -80dB RIGHT -80DB	250 mV	< 5mV	< 5mV

*** Use the by PSS delivered software to control the Renesas chip

9 Connections

Connector 1100 (Amplifier to Speakers)	
1	out Left +
2	out Left -
3	out Right –
4	out Right +

Blue Left +	**Grey Right +**
Black Left -	**Black Right -**

** Since the TDA 8920B is connected "antiphase" at its right and left input, the speakers should also be connected antiphase to obtain good phase behavior. Follow the connections as above described. Note also that Right + and Left – on Connector 1100 are interconnected to ground. This is important when measuring on this outputs

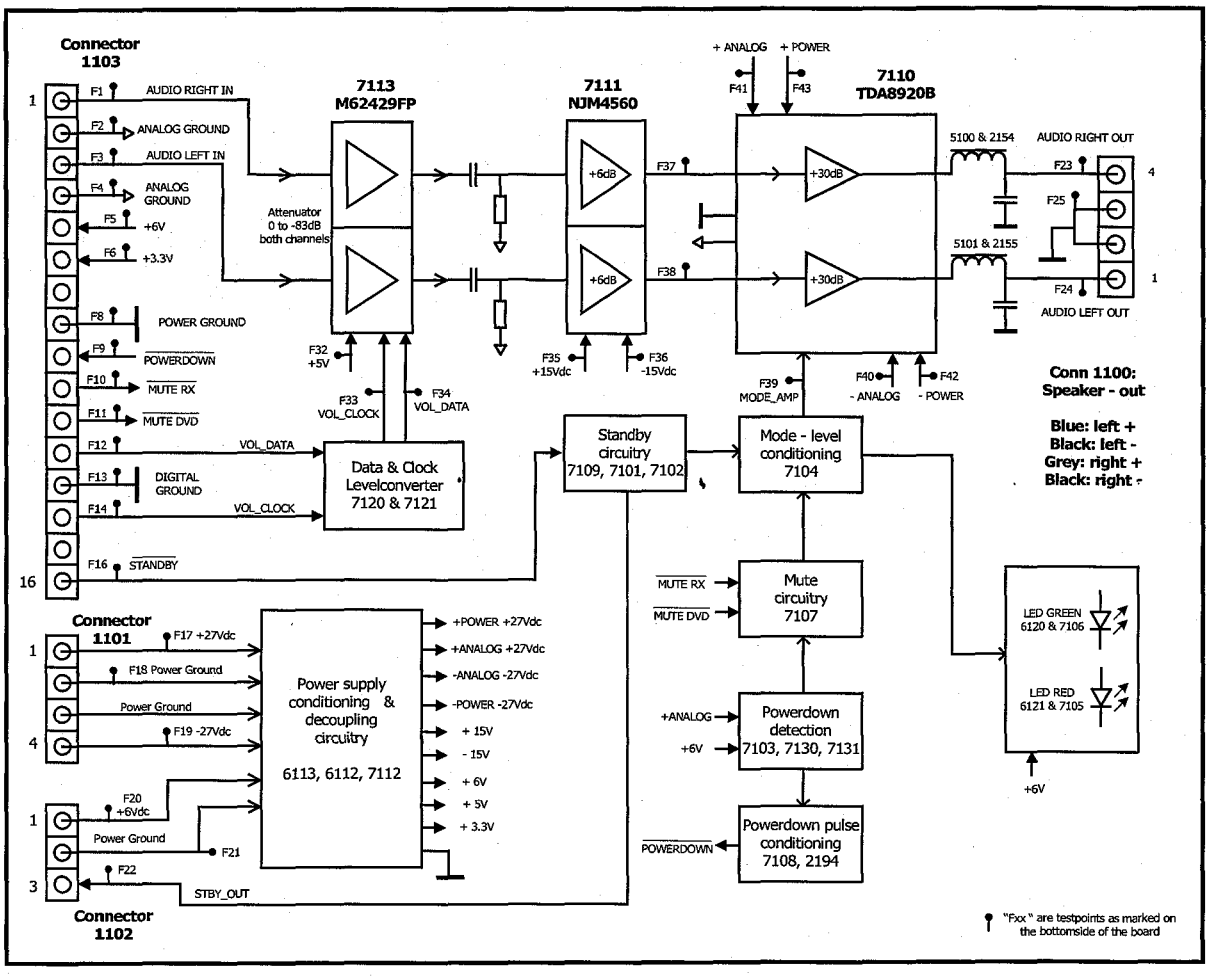
Connector 1101 (Amplifier to SMPS - powersection)	
1	+POWER 27Vdc from AC6632 SMPS / max consumption on this line: 1.4 A
2	GROUND POWER
3	GROUND POWER
4	-POWER -27Vdc from AC6632 SMPS / max consumption on this line: 1.4 A

Connector 1102 (Amplifier to SMPS – 6 Vdc section)	
1	+6VDC IN from AC6632 SMPS / max consumption on this line: 0.2 A
2	GROUND 6Vdc
3	STBY_OUT to the AC6632 supply / active high / High is SMPS off

Connector 1103(Amplifier to Receiver)	
1	**AUDIO LEFT IN** / maximum is 1Vrms from RX
2	**AUDIO GROUND**
3	**AUDIO RIGHT IN** / maximum is 1Vrms from RX
4	**AUDIO GROUND**
5	**+6VDC** for the receiver /max consumption is 200mA on this line
6	**+3.3VDC** / max consumption is 100mA on this line
7	**ID SEARCH** / Not used*
8	**POWER GROUND** for RX part
9	**POWERDOWN** from Amplifierboard / Detection of mains switch off / normal level is 3.2V / Pulse to ground of minimum 15mSec when mains interrupted*
10	**MUTE RX** / normal 3.3V on this line / groundlevel when mute by RX*
11	**MUTE DVD** / normal 3.3V on this line / groundlevel when mute by DVD / This command is transmitted from key1 at TX side to GPIO 1 on the RX board.
12	**VOLUME DATA** / dataline on 3V3 logic level for volumecontrol
13	**DIGITAL GROUND RX**
14	**VOLUME CLOCK** / clockline on 3V3 logic level for volumecontrol
15	**GPIO4** Not used - spare*
16	**STANDBY** / normal 3.3V on this line / groundlevel when standby by the RX / Normally this line drops low when no signal is received for a time > 4minutes. – timing by the Freesystems board*

10 Block diagram

Audio amplifier board 3104 137 00173



11 Mute circuitry

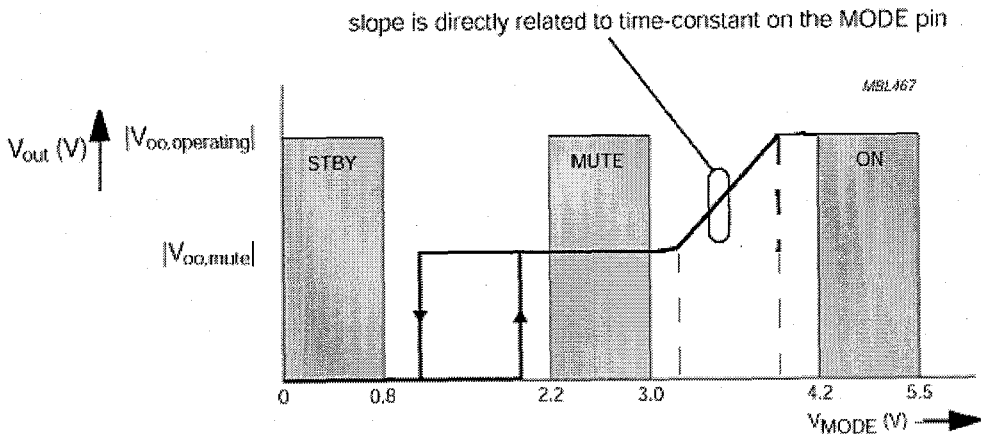
1. Normal operating condition or **PLAY mode:** the voltage on the "mode" pin of the amplifier TDA8920B will be 5Vdc. (level to be checked on F39) This mainly due to the resistors R3125, R3122, R3110 and saturated transistors 7106, 7102). Transistor 7104 and 7101 are not saturated at that moment. The green Led is on.

2. Pulling the amplifier into **MUTE condition** can be mainly done by the command MUTE_RX, MUTE_DVD or the powerdown mute circuitry around 7130 and 7103.
   - The RX module internally generates MUTE_RX when e.g. the fieldstrenght of the 2.4Ghz carrier is too low or severe multipath reception occurs.
   - MUTE_DVD is a command generated by the DVD main unit e.g. mute button on the remote or volume "0".
   - When the main supply +/- 27Vdc drops below +/- 15V or when the 6Vdc supply drops below 4.5 V a fast mute command is produced via diodes 6106 and / or 6101 towards 7104. (= this action happens when someone disconnect the unit from the mains)

   All "Mute" commands initiate the same fast action via 7107 and 7104 towards the amplifier mode pin. Both main mute commands are active low, and forces the level on the base of 7104 to 0.7Vdc, this results in a saturated 7104.
   The powerdown transistors 7103 and 7130 are normally always saturated. At voltage drops, a fast positive level is applied via diodes 6106 and 6101 on the base of 7104, resulting in 2.5Vdc on the mode pin of the amplifier. This avoids plops in the surroundspeakers. The resistors 3125 and 3121 define in this condition the level on the mode pin 6 of 7110 = TDA8920B: about 2.5Vdc. (level to be checked on F39). The slope of then transient between play and mute mode is the result of R3121 and C2185 (see below picture)

   When muted, all DC references of the amplifier stay as they were; the class D keeps on oscillating, the status led stays green but no sound is produced on the outputs. The control line (F22; connector 1102-pin 3) to the power supply stays low.

3. **The RX module initiates STANDBY or powersavemode.** When this module does not receive a valid signal for a time > 4minutes (time set in Eeprom of the RX module), pin 16 of 1103 drops low, 7109 saturates and the mode pin of the TDA8920 is pulled low by 7101 to about 0.15V. (level to be checked on F39). At this level the amplifierchip is in standbymode, all references are disabled, the oscillator stops. At the same moment the level on STBY_OUT becomes high (6Vdc) and disables the main +/- 27Vdc supply. Also the green led is switched off and the red led is switched on. In this condition the average power consumption (with the specified supply AC6632) out of the mains is about 1W @ 230V



4. ** Disconnecting the surround amplifier from the mains results in the following: A fast mutecommand is produced by the circuitry around 7103. This helps assuring plopfree operation. At the same moment 7131 saturates and enables an extra load of 47 ohm on the 6Vdc line: result is s a clean drop-down of the 6Vdc line. Out of the pulse on the base of 7131, 7108 and C 2194 produce a clean powerdown signal. This powerdown pulse is used by the receiver to start up a powerdown sequence and an additional fast mute on the audiolines of the RX-board. All these additional circuitry assures absolute plop- and glitch free operation in any circumstance.

5. ** At start up of the amplifier-receiver combination: there is always a delay on the mode pin of the TDA8920, this is done with R3125 / C2185 (100µF). Result is a plop-free startup.

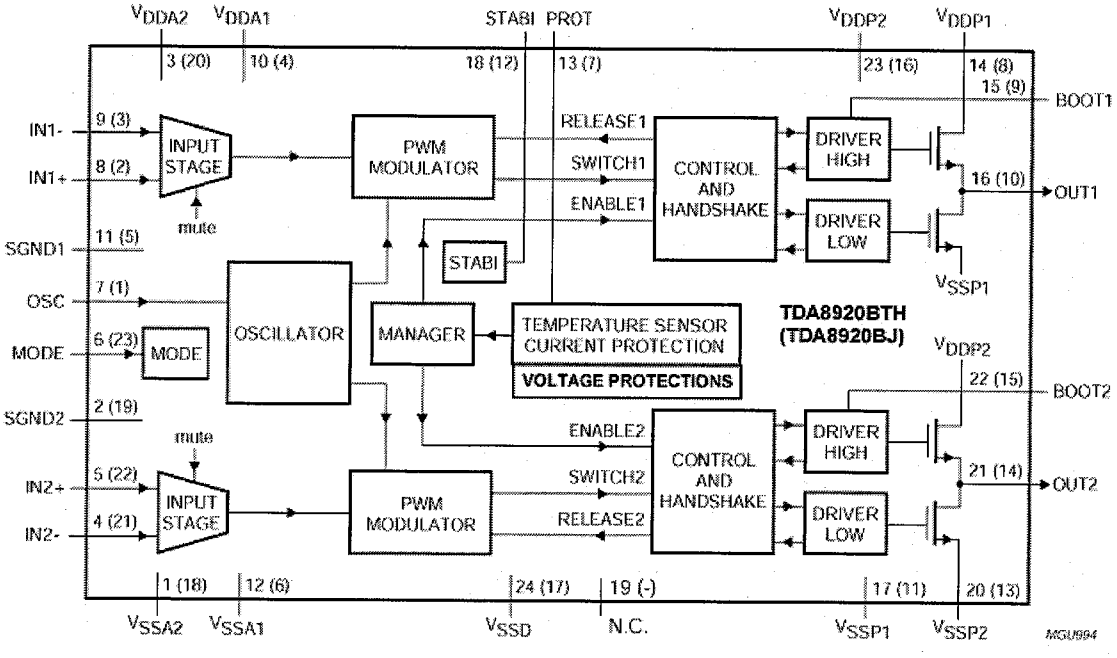
12 Amplifier considerations

The chosen amplifier TDA8920BTH operates on symmetrical +/-27.5 Vdc and can deliver 2 x 50 Watts into 6 ohm loads. In this application the heat sink, the housing and the power supply have been designed to assure 2 x 50 watts FTC (***) or 2 x 50 watts with music-like signals. Class D - technology minimizes the dissipation, thus resulting in an efficient high power amplifier in a rather small housing with limited heatsink. The class - D chip runs on a about 300kHz oscillator, therefore a 12dB / octave output filter is needed for EMI approval (coil 5100, 5101, and caps 2154, 2155)
Right input signals are 180° phase shifted by using the IN1 - (pin 9of 7110) input.
Left input signals are not phase shifted and applied on IN2 +(pin5 of 7110) input.
This is not a problem since the speaker connections in plug 1100 are managed in such a way that left and right are again in phase. This configuration is used to have a good balanced current handling of the power supply at low frequencies.
Input signals are filtered in the two-section high pass Sallen Key filter around 7111-1 and 7111-2. The – 3 db point is somewhere around 30Hz. This filter section has also an additional 6dB gain to assure good sound balance with the used DVD set. Also notice that a lot of EMI capacitors (100pF – 1nF) are designed in this amplifier board, since the final unit has to pass severe immunity tests up to 2 GHz.
Input sensitivity of the amplifier for maximum output when the attenuator chip 7113 is set to 0dB: typical 0.5 Vrms.
(see also datasheets concerning this device).

*** FTC power considerations & definitions.

both loaded channels are preheated for 1 hour at 1/8 of rated output power with a 1kHz sinewave. Immediately after follows a 5-min measurement where one channel is driven at specified power (= 50 watts @ max 10% THD) whereas the other channel is not driven. The full power operated channel has to deliver its power for the whole-specified bandwidth for the full 5 minutes. (T-ambient = 25°C).

Blockdiagram of TDA8920B



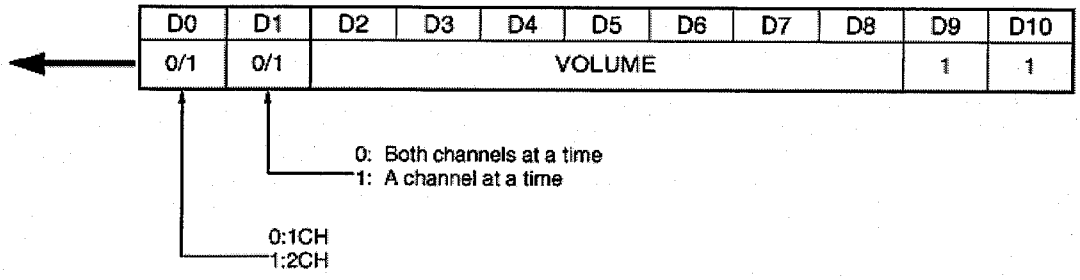
Pin numbers in parenthesis refer to the TDA8920BJ.

13 Volume chip M62429FP

A serial driven volumechip is used in the amplifierdesign. Control of this device is fully done by 2 lines out of the RX module. A clock and data signal is coming from pin 12 and 14 of 1103; these lines are on 3.3Vdc logic level. However, the volumechip operates on 5V logic. Therefore, transistors 7120 and 7121 form a level converter. The chip M62429 from Renesas has to receive a serial 10 bits data signal to set the desired attenuation (see below datapattern + volume code)

Note: At start-up the chip is in its initial maximum attenuation of – 83dB // so, when powering up the surroundreceiver with the mains plug, no sound at all will be heard in the speakers. The transmitter in the DVD player has to send a valid volume data and clockstream to the receiver to set a volume. Of course, if the surroundreceiver starts up from standby, the volumesetting will be at its last value (The volumechip is continuously powered from the 5Vdc when the surroundreceiver is in standby condition)

The DVD set sends every 4 seconds the last volumesetting to the receiver, this assures reliable volumesetting under all conditions.

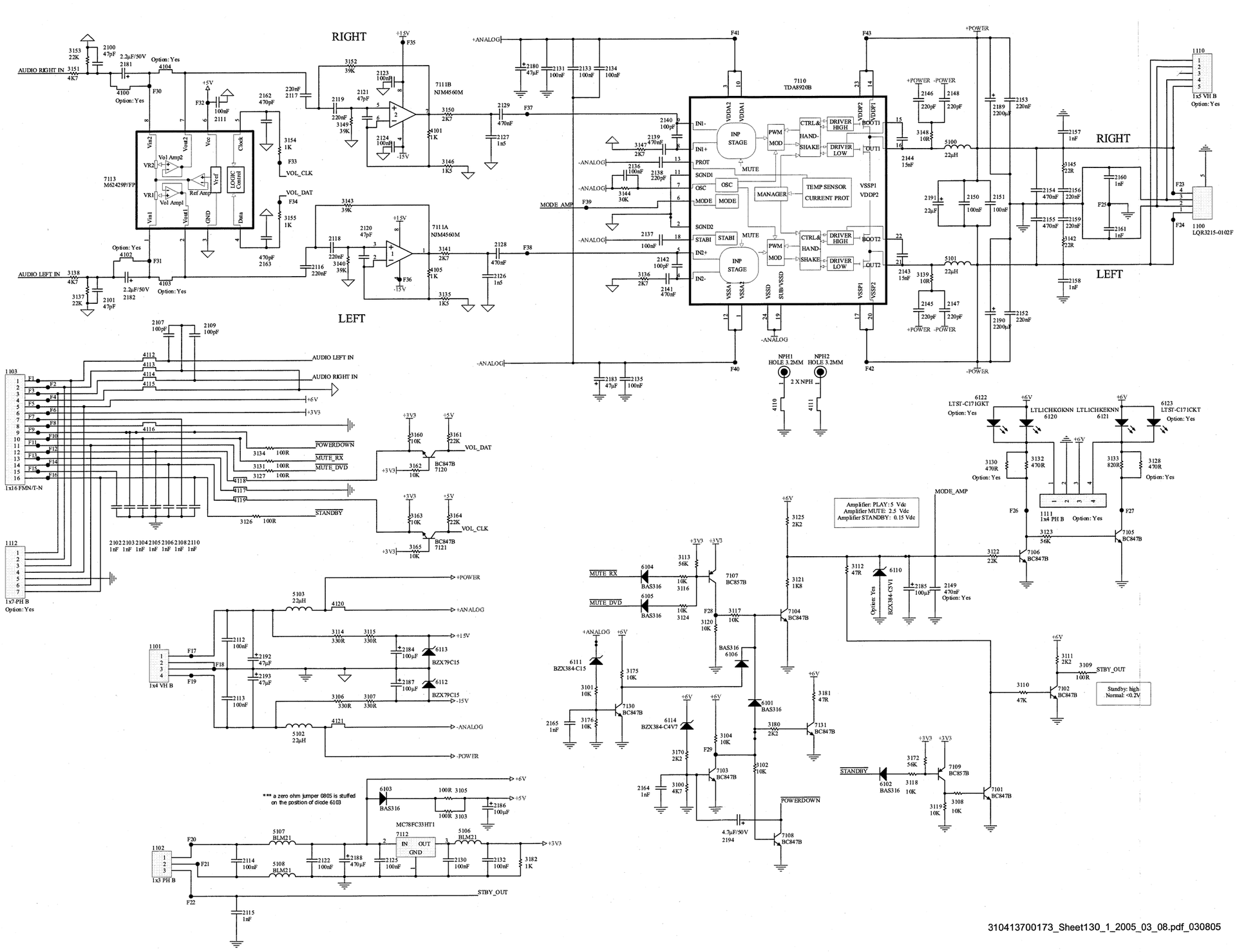


VOLUME CODE

ATT1	D2	D3	D4	D5	D6
0dB	H	L	H	L	H
-4dB	L	L	H	L	H
-8dB	H	H	L	L	H
-12dB	L	H	L	L	H
-16dB	H	L	L	L	H
-20dB	L	L	L	L	H
-24dB	H	H	H	H	L
-28dB	L	H	H	H	L
-32dB	H	L	H	H	L
-36dB	L	L	H	H	L
-40dB	H	H	L	H	L
-44dB	L	H	L	H	L
-48dB	H	L	L	H	L
-52dB	L	L	L	H	L
-56dB	H	H	H	L	L
-60dB	L	H	H	L	L
-64dB	H	L	H	L	L
-68dB	L	L	H	L	L
-72dB	H	H	L	L	L
-76dB	L	H	L	L	L
-80dB	H	L	L	L	L
-	L	L	L	L	L

ATT2	D7	D8
0dB	H	H
-1dB	L	H
-2dB	H	L
-3dB	L	L

Module PWR 04-01 Non-Wireless: Circuit Diagram (Part 1)



1100 B8
1101 C2
1102 D2
1103 B1
1110 A8
1111 C7
1112 C1
2100 A1
2101 B1
2102 C2
2103 C2
2104 C2
2105 C2
2106 C2
2107 B2
2108 C2
2109 B2
2110 C2
2111 A2
2112 C2
2113 C2
2114 D2
2115 D2
2116 B3
2117 A3
2118 B3
2119 A3
2120 B3
2121 A3
2122 D3
2123 A3
2124 A3
2125 D3
2126 B4
2127 A4
2128 B4
2129 A4
2130 D3
2131 A4
2132 D4
2133 A4
2134 A4
2135 B4
2136 A5
2137 B5
2138 A5
2139 A5
2140 A5
2141 B5
2142 B5
2143 B6
2144 A6
2145 B6
2146 A6
2147 B6
2148 A6
2149 C6
2150 A6
2151 A7
2152 B7
2153 A7
2154 A7
2155 B7
2156 A7
2157 A7
2158 B7
2159 B7
2160 A7
2161 B7
2162 A2
2163 B7
2164 D5
2165 D4
2180 A4
2181 A2
2182 B2
2183 B4
2184 C3
2185 C6
2186 D4
2187 C3
2188 D3
2189 A7
2190 B7
2191 A6
2192 C2
2193 C2
2194 D5

F1 B1
F2 B1
F3 B1
F4 B1
F5 B1
F6 B1
F7 B1
F8 B1
F9 B1
F10 B1
F11 B1
F12 B1
F13 B1
F14 C1
F15 C1
F16 C1
F17 C2
F18 C2
F19 C2
F20 D2
F21 D2
F22 D2
F23 A8
F24 B8
F25 A7
F26 C7
F27 C7
F28 C5
F29 D5
F30 A2
F31 B2
F32 A2
F33 A3
F34 A3
F35 A3
F36 B3
F37 A4
F38 B4
F39 A4
F40 B5
F41 A5
F42 B6
F43 A6

3100 D5
3101 C4
3102 D5
3103 D4
3104 D5
3105 D4
3106 C3
3107 C3
3108 D6
3109 C7
3110 C7
3111 C7
3112 C6
3113 C5
3114 C3
3115 C3
3116 C5
3117 C5
3118 D6
3119 D6
3120 C5
3121 C5
3122 C7
3123 C7
3124 C5
3125 C5
3126 C2
3127 C2
3128 C7
3130 C7
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3132 B7
3133 B7
3134 B2
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3136 B5
3137 B2
3138 B1
3139 B6
3140 B3
3141 B3
3142 B7
3143 A3
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3145 A7
3146 A3
3147 A5
3148 A6
3149 A3
3150 A3
3151 A1
3152 A3
3153 A2
3154 A3
3155 B3
3160 B3
3161 B3
3162 C3
3163 C3
3164 C3
3165 C3
3170 D5
3172 D6
3175 C4
3176 D4
3180 D5
3181 C6
3182 D4
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4117 C2
4118 C2
4119 C2
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5101 B6
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5103 C3
5106 D4
5107 D3
5108 D3
6101 C5
6102 D6
6103 D3
6104 C5
6105 C5
6106 C5
6110 C6
6111 C4
6112 C3
6113 C3
6114 C5
6120 B7
6121 B7
6122 B7
6123 B8
7101 D7
7102 C7
7103 D5
7104 C5
7105 C7
7106 C7
7107 C5
7108 D5
7109 D6
7110 A5
7111 A3
7111 B3
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7120 B3
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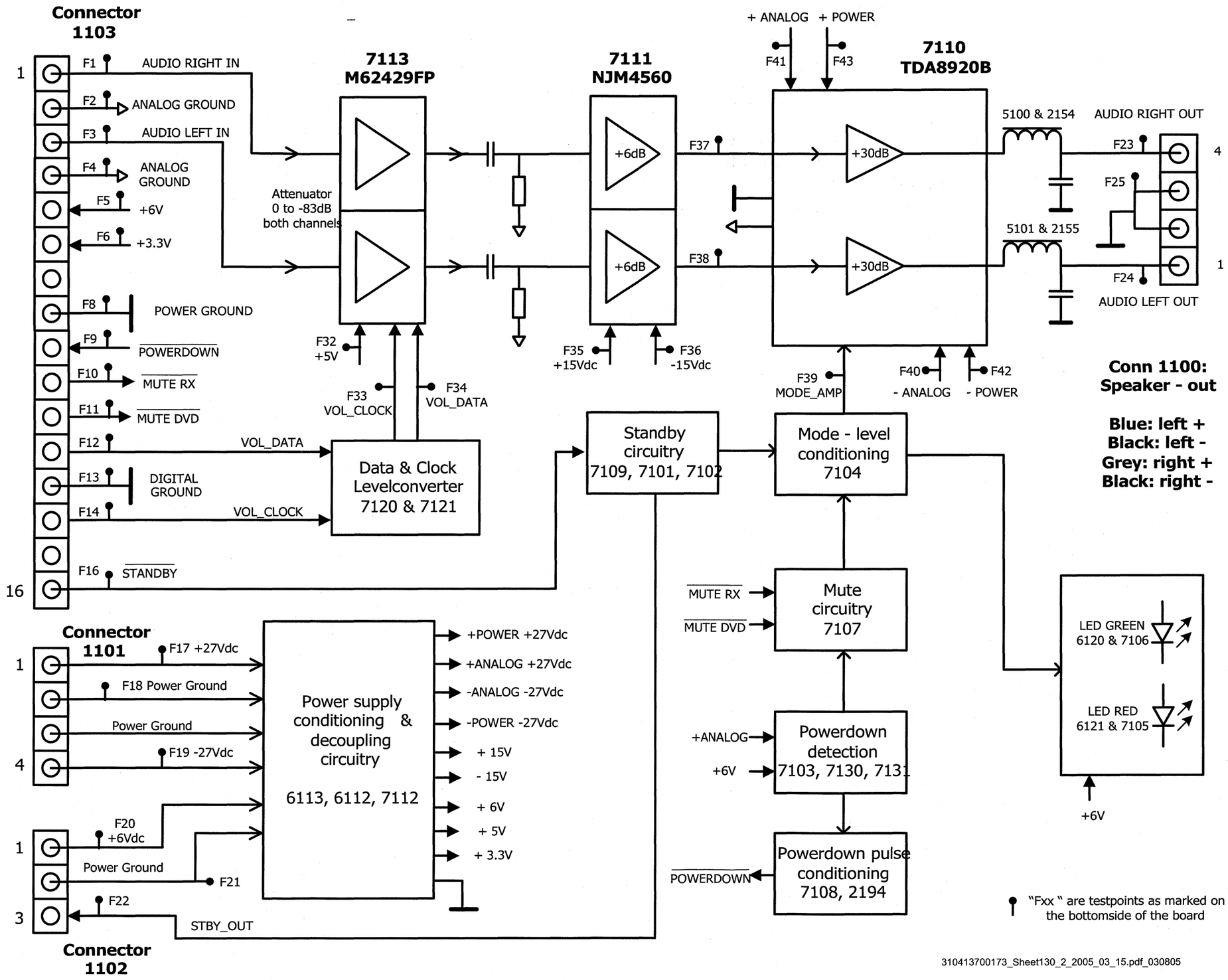
7130 C4
7131 D6

Module PWR 04-01 Non-Wireless: Circuit Diagram (Part 2)



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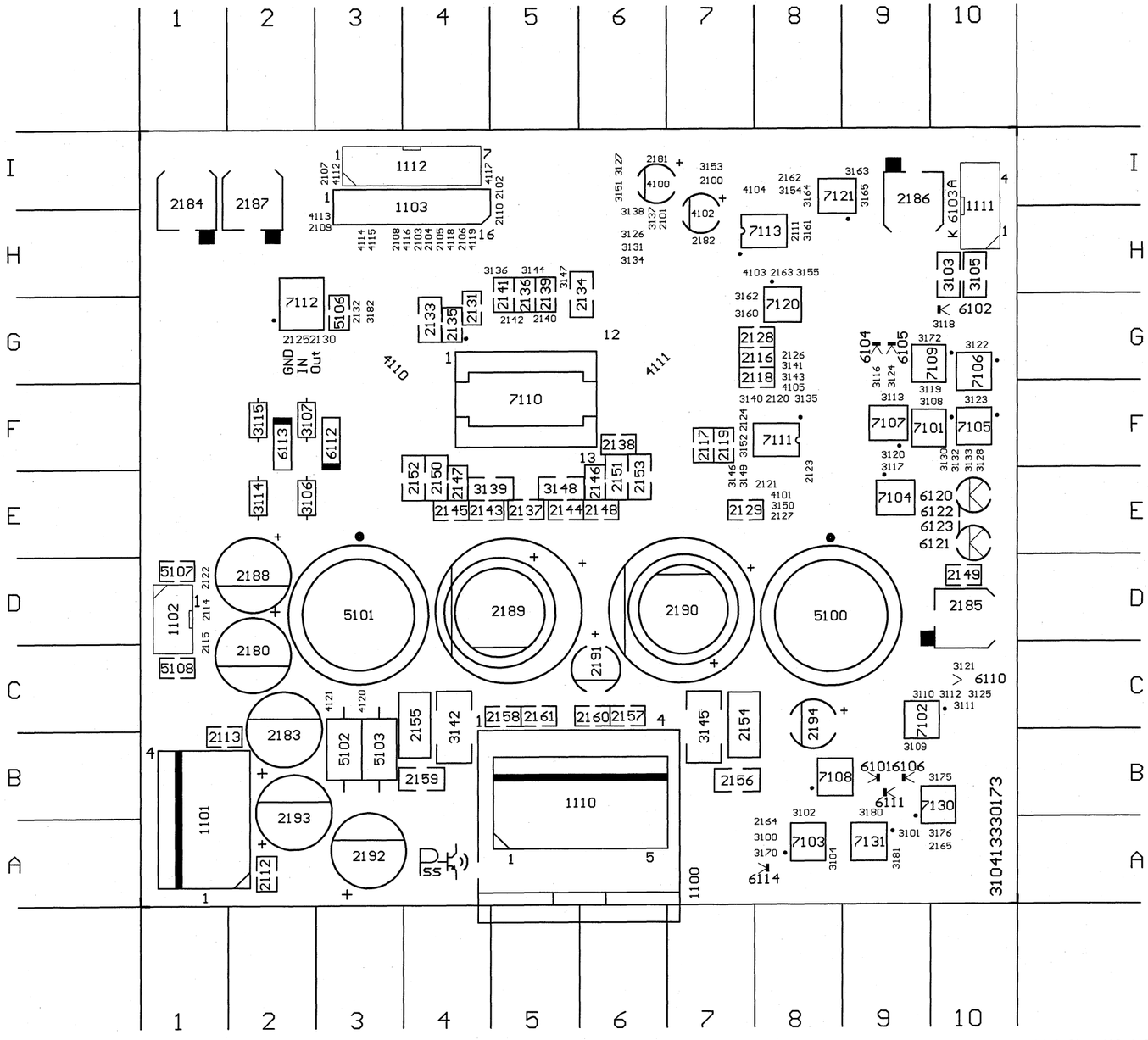
Module PWR 04-01 Non-Wireless: Circuit Diagram (Part 3)



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1100 6A	2140 5G	3106 2E	3154 8I	6111 9B	F21 1D
1101 1A	2141 5H	3107 2F	3155 8H	6112 3F	F22 1C
1102 1D	2142 5G	3108 9F	3160 7G	6113 2F	F23 6A
1103 4I	2143 4E	3109 9B	3161 8H	6114 8A	F24 5A
1110 6B	2144 5E	3110 9C	3162 7G	6120 10E	F25 5C
1111 10I	2145 4E	3111 10C	3163 9I	6121 10E	F26 10G
1112 4I	2146 6E	3112 10C	3164 8I	6122 10E	F27 10F
2100 7I	2147 4E	3113 9F	3165 9I	6123 10E	F28 9F
2101 6H	2148 6E	3114 2E	3170 8A	7101 9F	F29 8B
2102 5I	2149 10D	3115 2F	3172 9G	7102 9C	F30 7I
2103 4H	2150 4E	3116 9G	3175 10B	7103 8A	F31 7H
2104 4H	2151 6E	3117 9F	3176 10A	7104 9E	F32 9I
2105 4H	2152 4E	3118 10G	3180 9B	7105 10F	F33 8I
2106 4H	2153 6E	3119 9F	3181 9A	7106 10G	F34 8H
2107 3I	2154 7C	3120 9F	3182 3G	7107 9F	F35 7G
2108 3H	2155 4C	3121 10C	4100 6I	7108 8B	F36 7H
2109 3H	2156 7B	3122 10G	4101 8E	7109 9G	F37 7G
2110 5H	2157 6C	3123 10F	4102 7H	7110 5F	F38 6G
2111 8H	2158 5C	3124 9G	4103 7H	7111 8F	F39 7G
2112 2A	2159 4B	3125 10C	4104 7I	7112 2G	F40 4G
2113 1B	2160 6C	3126 6H	4105 8F	7113 8H	F41 5G
2114 1D	2161 5C	3127 6I	4110 3G	7120 8G	F42 5F
2115 1D	2162 8I	3128 10F	4111 6G	7121 8I	F43 5F
2116 8G	2163 8H	3130 10F	4112 3I	7130 10B	
2117 7F	2164 8A	3131 6H	4113 3H	7131 9A	
2118 8G	2165 10A	3132 10F	4114 3H		
2119 7F	2180 2C	3133 10F	4115 3H		
2120 8F	2181 6I	3134 6H	4116 4H	F1 2I	
2121 8E	2182 7H	3135 8F	4117 4I	F2 2H	
2122 1D	2183 2C	3136 5H	4118 4H	F3 2I	
2123 8E	2184 1I	3137 6H	4119 4H	F4 3H	
2124 7F	2185 10D	3138 6H	4120 3C	F5 3I	
2125 2G	2186 9I	3139 5E	4121 3C	F6 3H	
2126 8G	2187 2I	3140 7F	5100 8D	F7 3I	
2127 8E	2188 2D	3141 8G	5101 3D	F8 4H	
2128 8G	2189 5D	3142 4C	5102 3B	F9 4I	
2129 7E	2190 7D	3143 8G	5103 3B	F10 6H	
2130 3G	2191 6C	3144 5H	5106 3G	F11 4I	
2131 4G	2192 3A	3145 7C	5107 1D	F12 5H	
2132 3G	2193 2B	3146 7E	5108 1C	F13 4I	
2133 4G	2194 8C	3147 5H	6101 9B	F14 5I	
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2135 4G	3101 9A	3149 7E	6103 10H	F16 5I	
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2137 5E	3103 10H	3151 6I	6105 9G	F18 1A	
2138 6F	3104 8A	3152 7F	6106 9B	F19 1B	
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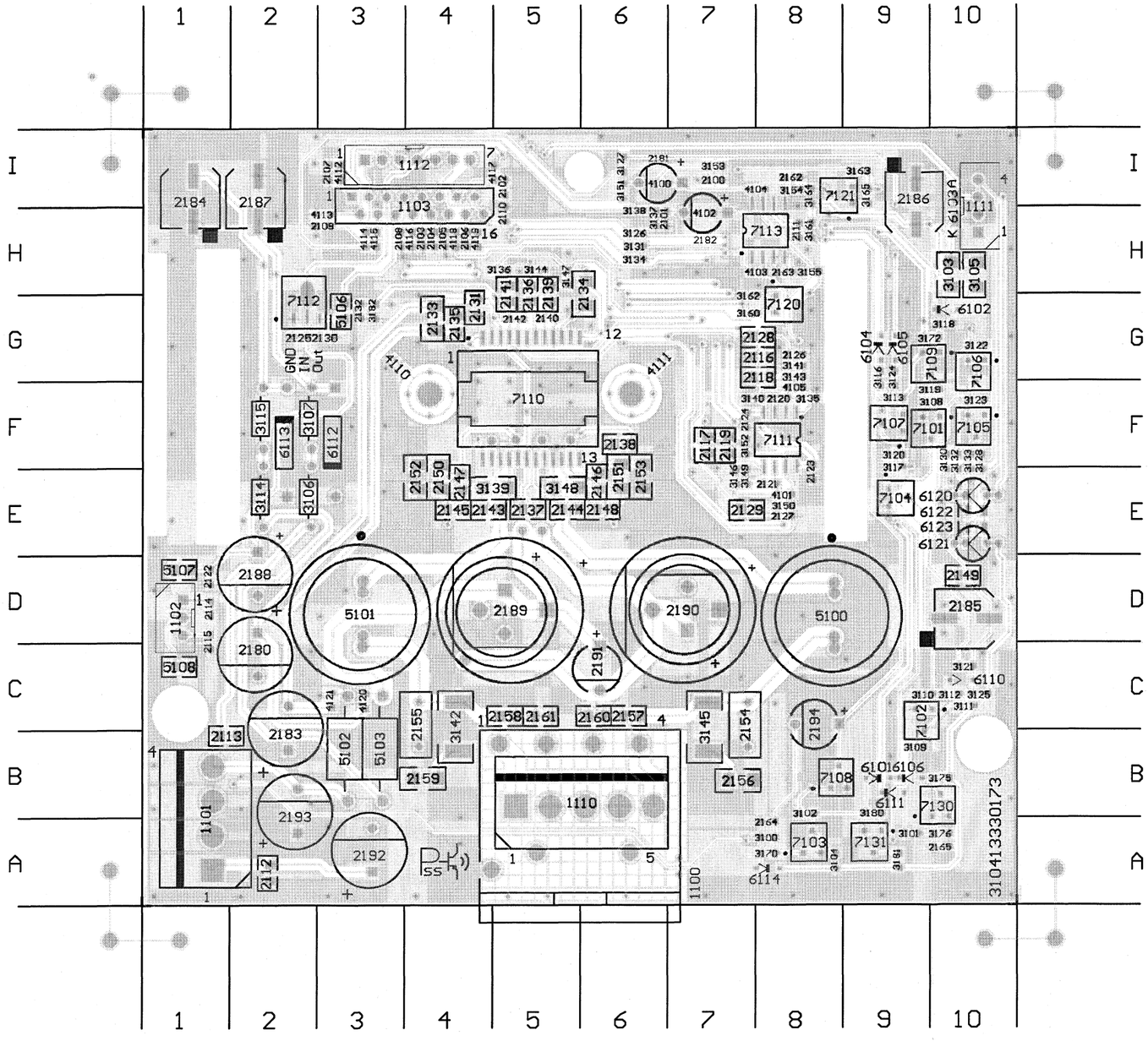
Layout: Module PWR 04-01 Non-Wireless (Topview)



1100 6A
1101 1A
1102 1D
1103 4I
1110 6B
1111 10I
1112 4I
2100 7I
2101 6H
2102 5I
2103 4H
2104 4H
2105 4H
2106 4H
2107 3I
2108 3H
2109 3H
2110 5H
2111 8H
2112 2A
2113 1B
2114 1D
2115 1D
2116 8G
2117 7F
2118 8G
2119 7F
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2123 8E
2124 7F
2125 2G
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2127 8E
2128 8G
2129 7E
2130 3G
2131 4G
2132 3G
2133 4G
2134 6H
2135 4G
2136 5H
2137 5E
2138 6F
2139 5H
2140 5G
2141 5H
2142 5G
2143 4E
2144 5E
2145 4E
2146 6E
2147 4E
2148 6E
2149 10D
2150 4E
2151 6E
2152 4E
2153 6E
2154 7C
2155 4C
2156 7B
2157 6C
2158 5C
2159 4B
2160 6C
2161 5C
2162 8I
2163 8H
2164 8A
2165 10A
2180 2C
2181 6I
2182 7H
2183 2C
2184 1I
2185 10D
2186 9I
2187 2I
2188 2D
2189 5D
2190 7D
2191 6C
2192 3A
2193 2B
2194 8C
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3101 9A
3102 8B
3103 10H
3104 8A
3105 10H
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3176 10A
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3181 9A
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4104 7I
4105 8F
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4111 6G
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4113 3H
4114 3H
4115 3H
4116 4H
4117 4I
4118 4H
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4121 3C
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5102 3B
5103 3B
5106 3G
5107 1D
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6103 10H
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7112 2G
7113 8H
7120 8G
7121 8I
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7131 9A
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F2 2H
F3 2I
F4 3H
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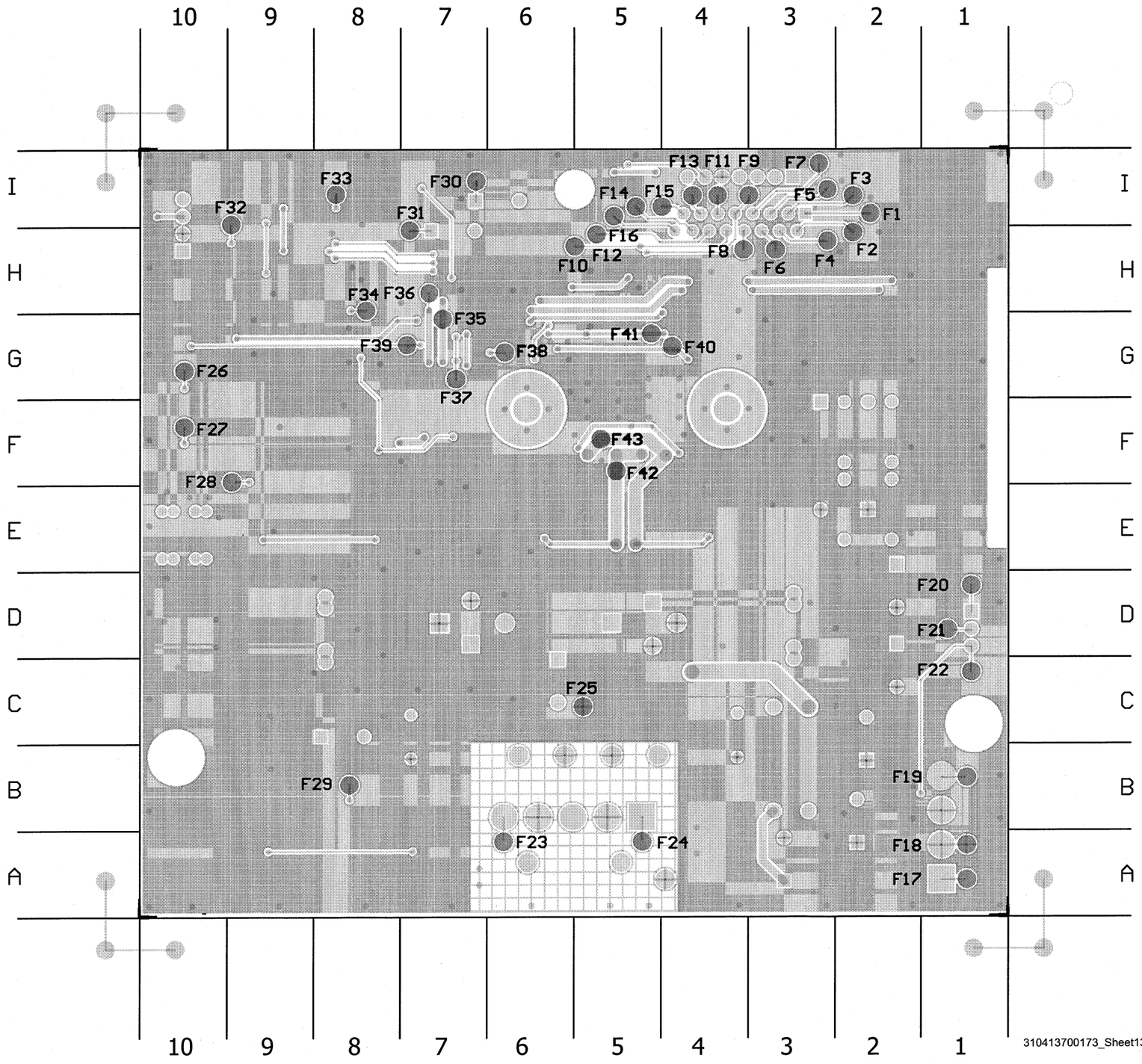
F6 3H
F7 3I
F8 4H
F9 4I
F10 6H
F11 4I
F12 5H
F13 4I
F14 5I
F15 5I
F16 5I
F17 1A
F18 1A
F19 1B
F20 1D
F21 1D
F22 1C
F23 6A
F24 5A
F25 5C
F26 10G
F27 10F
F28 9F
F29 8B
F30 7I
F31 7H
F32 9I
F33 8I
F34 8H
F35 7G
F36 7H
F37 7G
F38 6G
F39 7G
F40 4G
F41 5G
F42 5F
F43 5F

Layout: Module PWR 04-01 Non-Wireless (Bottom view)



F1 2I	F21 1D	F41 5G
F2 2H	F22 1C	F42 5F
F3 2I	F23 6A	F43 5F
F4 3H	F24 5A	
F5 3I	F25 5C	
F6 3H	F26 10G	
F7 3I	F27 10F	
F8 4H	F28 9F	
F9 4I	F29 8B	
F10 6H	F30 7I	
F11 4I	F31 7H	
F12 5H	F32 9I	
F13 4I	F33 8I	
F14 5I	F34 8H	
F15 5I	F35 7G	
F16 5I	F36 7H	
F17 1A	F37 7G	
F18 1A	F38 6G	
F19 1B	F39 7G	
F20 1D	F40 4G	

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HTS5000W/12/51
MISCELLANEOUS

0102	3139 247 51831		BADGE PHILIPS ASSY SILVER
0119	3139 244 06041		BUTTON POWER/STANDBY PNT PRT
0120	3139 244 06031		BUTTON OPEN/CLOSE PNT PRT
0124	3139 244 06021		BUTTON SET SOURCE/CTRL PNT PRT
0127	3139 244 06011		KNOB VOLUME CHROME
0129	3139 247 60792		WINDOW DISPLAY EU-USB PRT
0165	3139 243 10080		CUSHION FOOT
0327	3139 247 11491		W.LESS SPK SYSTEM AD908W/12
0331	2422 076 00546		CBLE FM AERIAL 24AWG BK B
0332	2422 549 45386		ANT AM LOOP LAN-011 B
0332	2422 549 45813		ANT AM LOOP 039S20014 B
0333	3139 258 70142		REMOTE CONTROL HTS5000W/12
0336	4822 321 11499	⚠	MAINSCORD 2.0M - EU
0342	2422 076 00468	⚠	CBLE SCART 1M1 SCART 21P BK B
1010	3139 118 58342		PCBA MONO HTS5000W EU
1010	3139 118 58512		PCBA DISPLAY HTS3000S EU
1020	3139 247 11451		LOADER ASSY(TP SONY)HTS5000W
1020	3139 118 58492		PCBA STAND-BY KEY HTS3000S
1030	3139 117 11061	⚠	PCBA PSU 04-01 EU (MITSUMI)
1030	3139 118 58692		PCBAS USB BOARD HTS5000
1040	2422 542 00014		TUN A F ENG078VVQF EUR B
8001	3139 241 01381		FFC FOIL10P/120/10P AD FOLD
8004	3139 241 01251		FFC 13P/180/13P AD 1MMP FOLD

BOX SPK ASSY SW-5000HTS/12

	9965 000 30408	SUBWOOFER SPK HTS5000W
	9965 000 28375	RUBBER FOOT
	9965 000 28376	CABLE A'SSY 5.3M PURPLE SMK

BOX SPK ASSY CS-5000HTS/12

	9965 000 30409	SPK BOX (FRONT L)
	9965 000 30410	SPK BOX (FRONT R)
	9965 000 30411	SPK BOX (REAR L)
	9965 000 30412	SPK BOX (REAR R)
	9965 000 28363	CABLE A'SSY 5.2M WHITE SMK
	9965 000 28364	CABLE A'SSY 5.2M RED SMK
	9965 000 28365	CABLE A'SSY 5.2M BLUE SMK
	9965 000 28366	CABLE A'SSY 5.2M GREY SMK
	9965 000 28370	RUBBER FOOT 40LX6WX2.5T
	9965 000 30413	SPK BOX (CENTRE)
	9965 000 28371	RUBBER FOOT 40.5LX6.0WX1.5T
	9965 000 28367	CABLE A'SSY 5.2M GREEN SMK S

PCBA DISPLAY HTS3000S EU
MISCELLANEOUS

1701	3139 111 04131	FTD HUV-08SS57T (LX-3900SA)
1705	2422 129 16836	ROT ENCODER 12P EVEGC2F2012B B
1710	4822 276 13775	SWITCH
1711	4822 276 13775	SWITCH
1712	4822 276 13775	SWITCH
1713	4822 276 13775	SWITCH
1714	4822 276 13775	SWITCH
1716	4822 276 13775	SWITCH
1717	2422 540 98011	RES CER 455KHZ CSB*E B

DIODES

6700	9322 179 76676	LED VS LTL-816EELC (LITO) A
6701	9340 548 54115	DIO REG SM PDZ6.2B (PHSE) R
6704	4822 130 11397	BAS316
6705	4822 130 11397	BAS316
6706	4822 130 11397	BAS316
6707	4822 130 11397	BAS316
6708	4822 130 11397	BAS316
6709	4822 130 11397	BAS316
6710	4822 130 11397	BAS316
6711	4822 130 11397	BAS316
6712	4822 130 11397	BAS316
6713	4822 130 11397	BAS316
6714	4822 130 11397	BAS316
6715	4822 130 11397	BAS316
6716	4822 130 11397	BAS316
6717	4822 130 11397	BAS316
6718	4822 130 11397	BAS316
6719	4822 130 11397	BAS316
6720	4822 130 11397	BAS316

TRANSISTORS & INTEGRATED CIRCUITS

7701	9322 185 95667	IR RECEIVER TSOP4836 (VISH)L
7704	5322 130 60159	BC846B
7705	4822 130 42804	BC817-25
7706	4822 130 60373	BC856B
7707	5322 130 60159	BC846B
7708	9322 217 04671	IC SM V63111LF (VAIT) Y

PCBA STAND-BY KEY HTS3000S

1901	4822 276 13775	SWITCH